

SHARP SERVICE MANUAL

S27Z5VC-779E/

VHS VIDEO CASSETTE RECORDER

MODEL VC-779E

In the interests of user-safety (Required by safety regulations in some countries) the set should be restored to its original condition and only parts identical to those specified should be used.

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SPECIFICATIONS

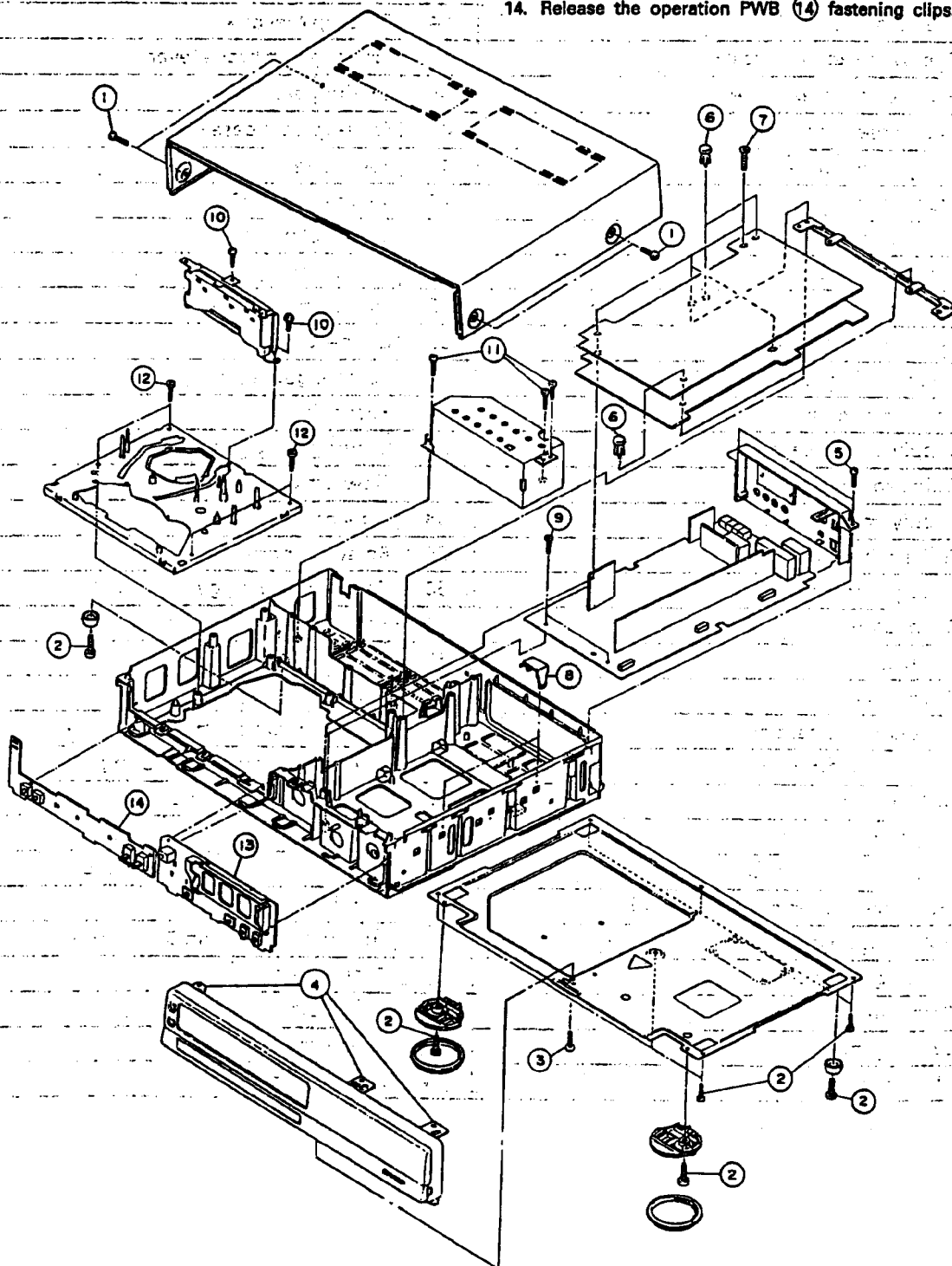
Format:	VHS standard
Video recording system:	Rotary two-head helical scan system with slant double-azimuth combination video head.
Video signal:	PAL: PAL System-B/G (P.B/REC)
	PAL: PAL System-I (P.B/REC)
	PAL: PAL System-D (P.B/REC)
SECAM:	MESECAM System (P.B/REC)
SECAM:	SECAM System-B/G (P.B/REC)
SECAM:	SECAM System-D/K (P.B/REC)
NTSC:	NTSC 4.43 (P.B/REC)
NTSC:	NTSC 3.58 (P.B/REC)
Recording playing time:	240 min max. with SHARP E-240 tape (PAL/MESECAM/SECAM in SP mode)
	8 hours max. with SHARP E-240 tape (PAL/MESECAM/SECAM in LP mode)
	160 min max. with SHARP T-160 tape (NTSC in SP mode)
	320 min max. with SHARP T-160 tape (NTSC in LP mode)
	8 hours max. with SHARP T-160 tape (NTSC in EP mode)
Tape width:	12.7 mm
Tape speed:	23.39 mm/sec. (PAL in SP mode) 33.35mm/msec. (NTSC in SP mode)
	11.7mm/sec. (PAL in LP mode) 16.68mm/sec. (NTSC in LP mode)
	11.12 mm/sec. (NTSC in EP mode)
Antenna:	75 ohm unbalanced
Receiving channel:	VHF E2~ E12, (44.25MHz ~294.25MHz)
	UHF E21~ E69, (471.25MHz ~885.25MHz)
RF converter output signal:	UHF Channel E30 ~ E39 (adjustable). Preset to Channel E36
	UHF Channel US26~US38(adjustable). Preset to Channel US34
	UHF Channel J25~J37 (adjustable). Preset to Channel J33
Power requirement:	AC 100~240V, AUTO 50/60 Hz
Power consumption:	Approx. 23W (at AC 220V 50Hz)
Operating temperture:	5°C to 40°C
Storage temperature:	-20°C to 55°C
Weight:	5.8 kg
Dimensions:	430 mm (W) x 350 mm (D) x 89 mm (H)
VIDEO	
Input:	1.0 Vp-p, 75 ohm
Output:	1.0 Vp-p, 75 ohm
AUDIO	0 dB = 0.775 Vrms
Input:	Line: - 8 dB, more than 50k ohm
Output:	Line: - 5 dB, less than 1k ohm
AUDIO	0 dB = 0.775 Vrms
Input:	Line: - 3.8 dB, more than 50k ohm
Output:	Line: - 3.8 dB, less than 1k ohm
Accessories included:	Antenna 75 ohm coaxial connector cable (plug provided)
	Operation Manual
	Infrared Remote control

As part of our policy of continuous improvement, we reserve the right to alter design and specifications without notice.

Note: The antenna must correspond to the new standard DIN 45222 (IEC 169 - 2) for combined UHF/VHF antenna with 75 ohm connector.

DISASSEMBLY AND REASSEMBLY

1. Remove the four upper cabinet fastening screws ①.
2. Remove the six bottom panel fastening screws ②.
3. Remove the one front panel fastening screw ③.
4. Release the three clips ④ and remove the front panel.
5. Remove the two antenna terminal cover fastening screws ⑤.
6. Remove the two push rivets which fasten the syscon servo unit and the angle.
7. Remove the four syscon servo unit fastening screws ⑦.
8. Remove the Y/C PWB holder ⑧.
9. Remove the two main PWB fastening screws ⑨.
10. Remove the two head amp PWB fastening screws ⑩.
11. Remove the three power unit fastening screws ⑪.
12. Remove the four mechanism chassis fastening screws ⑫.
13. Release the timer PWB ⑬ fastening clips.
14. Release the operation PWB ⑭ fastening clips.

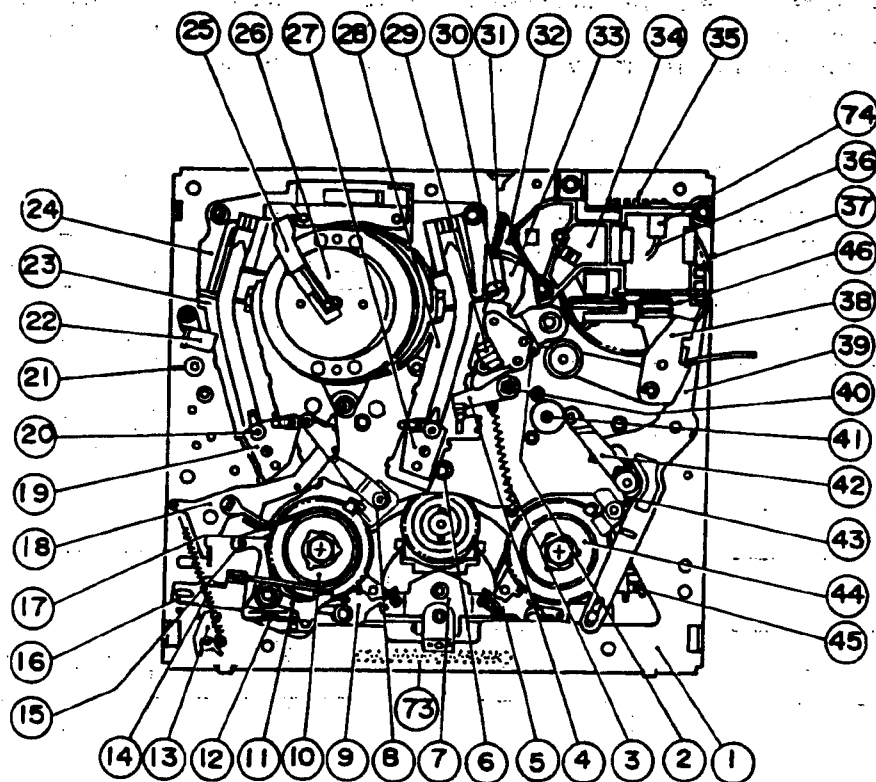


LOCATION LIST OF MECHANICAL PARTS

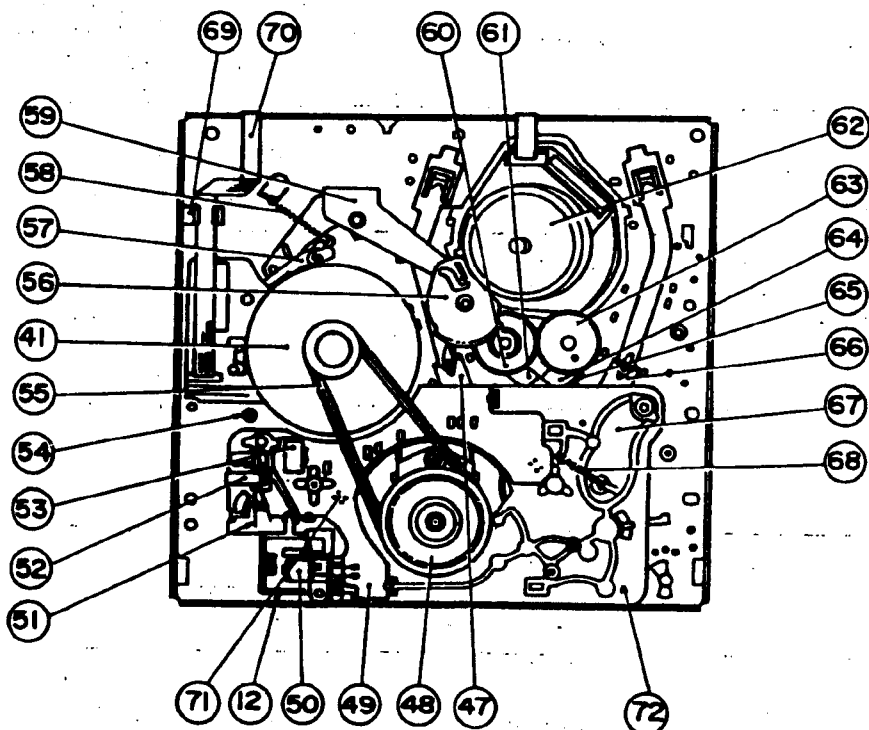
No.	Part Name	No.	Part Name
1	Main chassis ass'y	38	Pinch roller lever ass'y
2	A/C head arm	39	Relay shifter lever
3	Half-loading lever spring	40	Retaining guide
4	Half-loading lever	41	Capstan D.D. motor
5	Main take-up brake lever	42	Reverse guide
6	Cassette LED	43	Reverse guide spring
7	Idler gear ass'y	44	Take-up reel disk
8	Supply reel stopper ass'y	45	Video search brake lever
9	Main supply brake lever	46	Loading belt
10	Supply reel disk	47	Take-up pole base slider
11	Back tension lever	48	Reel pulley
12	Brake shifter	49	Reel sensor PWB
13	Tension spring hook plate	50	Brake solenoid
14	Tension spring	51	Shifter spring
15	Tension release lever	52	Shifter spring cover
16	Tension band ass'y	53	Connector
17	Auxiliary fast forward brake lever	54	Reverse guide spring
18	Tension arm ass'y	55	Reel belt
19	Supply pole base ass'y	56	Loading relay gear
20	Guide roller ass'y	57	Slow brake lever
21	Supply impedance roller	58	Slow brake spring
22	Full erase head ass'y	59	Relay gear drive lever
23	Supply loading rail	60	Take-up loading gear
24	Drum base	61	Take-up loading arm ass'y
25	Earth brush ass'y	62	Drum D.D. motor ass'y
26	Drum ass'y	63	Supply loading gear
27	Take-up pole base ass'y	64	Supply loading arm ass'y
28	Take-up loading rail	65	Loading reciprocating spring
29	A/C head ass'y	66	Supply pole base slider
30	X-position adjusting nut	67	Reel block chassis
31	Half-loading reciprocating spring	68	Auxiliary fast forward brake spring
32	Half-loading reciprocating lever	69	Full flat cable holder
33	Half-loading drive lever	70	Full flat cable(Drum D.D. motor)
34	Loading block ass'y	71	Reel sensor
35	Cam switch	72	Reel block
36	Loading motor	73	Main brake spring
37	Master cam	74	Dew sensor

LOCATION OF MECHANICAL PARTS

• TOP VIEW



• BOTTOM VIEW



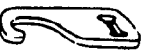
ADJUSTMENT, REPLACEMENT, ASSEMBLY AND CLEANING OF MECHANICAL UNITS

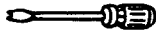
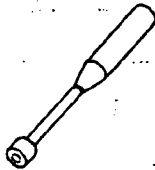
Here we will describe a relatively simple service work in the field, not referring to the more complicated repairs which would require the use of special equipment and tools (drum assembly or replacement, for example).

We are sure that the easy-to-handle tools listed below would be more than handy for periodical maintenance to keep the machine in its original efficient condition.

TOOLS NECESSARY FOR ADJUSTING THE MECHANICAL UNITS

The following tools are required for proper service and satisfactory repair.

No.	Jig Item	Part No.	Code	Configuration	Remarks
1	Reel Disk Height Adjusting Jig	JIGRH0002	BR		These Jigs are used for checking and adjusting the reel disk height.
2	Master Plane Jig	JIGMP0001	BY		
3	A/C Head Tilt Adjusting Jig	JIGACH-F18	BU		This Jig is used for setting the A/C head tilt.
4	Torque Gauge (90g)	JIGTG0090	CM		These Jigs are used for checking and adjusting the torque of take-up and supply reel disks.
	Torque Gauge (1.2 kg)	JIGTG1200	CN		
5	Gauge Head	JIGTH0006	AW		
6	Cassette Torque Meter	JIGVHT-063	CZ		This cassette torque meter is used for checking and adjusting the torque of take-up and supply reel and for measuring tape back tension.
7	Tension Gauge (300g)	JIGSG0300	BF		There are two Gauges used for the tension measurements, 300 g and 2.0 kg.
	Tension Gauge (2.0 kg)	JIGSG2000	BS		
8	Hex Wrench (0.9 mm)	JIGHW0009	AE		These Jigs are used for loosening or tightening special Hexagon type screws.
	Hex Wrench (1.2 mm)	JIGHW0012	AE		
	Hex Wrench (1.5 mm)	JIGHW0015	AE		
9	Alignment Tape (PAL)	VROCP5V	CK		This tape is especially used for electrical fine adjustment.
10	Drum Replacing Jig	JIGDT-0001	BG		This is used for replacement of the VCR's upper drum.
11	Tension Gauge Adapter	JIGADP003	BK		This Jig is used for the tension gauge. Rotary Transformer Clearance Adjusting Jig.

No.	Jig Item	Part No.	Code	Configuration	Remarks
12	Special Bladed Screwdriver	JiGDRIVERH-4	AP		This Screwdriver is used for adjusting the guide roller height and X-position.
13	Tension Band and Plate Adjusting Jig	JiGDRIVER-6	BM		This Jig is used for adjusting the tension band and tension plate.
14	Torque Driver	JiGTD1200	CB		This is used to screw down resin-made parts: the specified torque is 5 kg.
15	Box Driver	JiGDRIVER110-7	AS		This Jig is used for height adjustment of the A/C head.
		JiGDRIVER110-4	AV		This Jig is used for height adjustment of the retaining guide.
16	Retaining Guide Height Adjusting Jig	JiGGH-F18	BU		This Jig is used for height adjustment of the retaining guide.
17	Reverse Guide Height Adjusting Jig	JiGRVGH-F18	BU		This Jig is used for height adjustment of the reverse guide.

NOTE:

Current JiGMA0001 contains Master Plane (JiGMP0001) and Disk Height Adjusting Jig (JiGRH0001). Even though new Disk Height Adjusting Jig (JiGRH0002) covers greater height, this new Jig (JiGRH0002) can be used for current JiGRH0001, but current Jig (JiGRH0001) cannot be used as JiGRH0002. Master Plane (JiGMP0001) can be used with JiGRH0001 and JiGRH0002 as well.

MECHANICAL PARTS REQUIRING PERIODICAL INSPECTION

Use the following table as a guide to maintain the mechanical parts in good operating condition.

Parts	Maintained every	500 hrs.	1000 hrs.	1500 hrs.	2000 hrs.	3000 hrs.	Remarks
Guide roller ass'y		□	□	□	□	□	Abnormal rotation or significant vibration requires replacement.
Supply impedance roller		□	□	□	□	□	
Supply impedance roller (inner)			□		□	□	Clean with pure high quality isopropyl alcohol.
Supply impedance roller flange		□	□	□	□	□	Clean tape contact area with the specified cleaning liquid.
Retaining guide		□	□	□	□	□	
Slant pole		□	□	□	□	□	
Video head		□	○□	□	○□	○□	Clean tape contact area with the specified cleaning liquid.
Full-erase head		□	□	□	□	□	
A/C head		□	□	□	□	□	
Pinch roller		□	□	□	□	○□	Clean rubber and rubber contact area with the specified cleaning liquid.
Reel belt			□		□		
Loading belt			□		○		
Capstan loading belt			□		○		
Reel block*					○		
Tension band ass'y						○	
*See the table below for servicing the reel block parts.							
Supply/take-up reel disks			□ Δ		□ Δ ○		Clean with pure high quality isopropyl alcohol.
Video search brake lever					○		
Idler gear ass'y					○		
Main supply/take-up brake levers					○		

NOTE: ○: Part replacement.
□: Cleaning (For cleaning, use a lint-free cloth dampened with pure isopropyl alcohol).
△: Oil refilling (The indicated point should be lubricated with high quality spindle oil every 1000 hrs).

This model has no adjusting parts for torques, tension, etc. If the reading is outside the specified range, clean or replace the part.

REMOVAL AND REASSEMBLY OF CASSETTE HOUSING CONTROL ASSEMBLY

Notes:

1. During removal and reassembly, be careful not to strike the nearby guide pin, drum, etc.
2. Before removal or reassembly, be sure to unplug the recorder from the AC outlet.
3. When removing and attaching the cassette loading belt, be careful to keep it free from grease.

• Removal

1. Put the unit in the cassette eject position.
2. Remove the cassette loading belt ①.
3. Disconnect the FFC (Full Flat Cable) ② at the right side of the cassette housing control assembly.

Note: Be careful not to break the FFC.

4. Remove the two cassette housing installation screws.
5. Move the cassette housing control assembly (Fig. 1-1) in the direction of arrow ⇒ ③, and pull it out straight upward.

• Reassembly

1. Insert the tabs of the cassette housing control assembly into the mechanism chassis, move it in the direction of arrow ⇒ ④, and secure temporarily.
- Check to see if the cassette housing control assembly is in the correct position, and then tighten the two screws (XHPS330P06WS0).
2. Attach the cassette loading belt ①.
 3. Connect the FFC ② at the right side of the cassette housing control assembly.

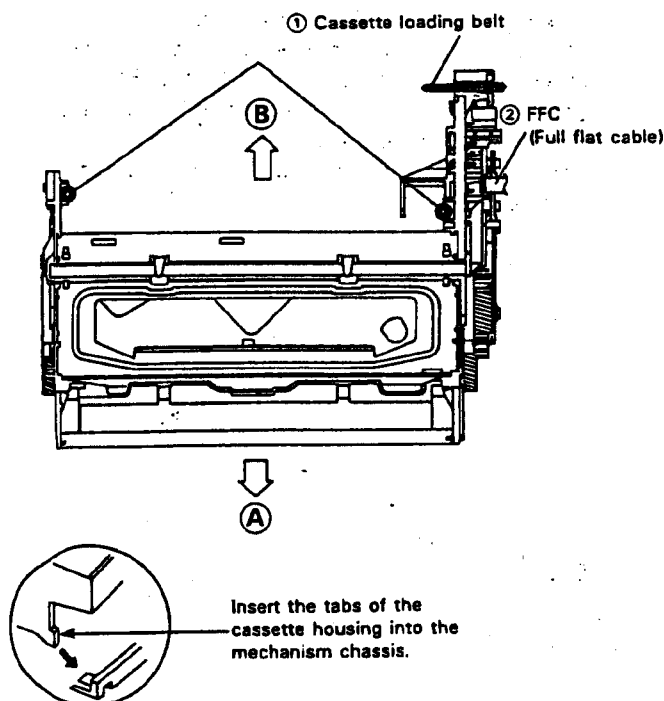


Figure 1-1.

REPLACEMENT OF WORM WHEEL ASSEMBLY

• Removal (Fig. 1-2)

1. Unsolder the cassette switch connector from the start sensor PWB ①.
 2. Release the two catches ② on the cassette housing frame (R), and remove the PWB.
 3. Unscrew one B tight screw ③ to detach the worm bracket ④.
- Note: The bearing ⑤ can come off position too. So be careful not to let the bearing fall.
4. Remove the worm shaft assembly ⑥, pulley ⑦ and cassette loading belt ⑧ all from the cassette housing frame (R).
 5. Finally pull the worm wheel assembly out of the boss of the cassette housing frame (R).

• Reassembly (Fig. 1-2)

1. Turn the phase gear ⑨ clockwise until the slider comes to a halt in the cassette insertion direction.
 2. Set up the worm wheel gear assembly onto the boss on the cassette housing frame (R), matching the mark ⑩ on the phase gear ⑨ with the mark ⑪ on the worm wheel gear.
- Note: Make sure that the slider pin is in the groove of the drive gear arm.
3. Install the pulley ⑥ and apply the cassette loading belt ⑧ both on the worm shaft assembly ⑥. Couple the clutch ⑫ to the clutch lever ⑬. And mount them together in the cassette housing frame (R).
 4. Attach the worm bracket ④ to the worm shaft assembly ⑥. Place them onto the boss on the cassette housing frame (R).
 5. Tighten one B tight screw ③.
- Note: Make sure that the parts ④ and ⑤ of the cassette housing frame (R) are properly engaged with the parts ⑥ and ⑦ of the worm bracket ④.
6. Hook the start sensor PWB ① on the two positions ② on the cassette housing frame (R).
- Note: Check that the switch connector is right in the cassette switch mounting hole ③.
7. Finally resolder the cassette switch connector to the start sensor PWB.

Notes:

1. Do not overtighten the B tight screw (no more than 5.0 ± 0.5 kg. cm), because otherwise the lower threads of the screw hole at the resin-made boss may be broken.
2. Keep in mind that the clutch switching lever should be in the correct positional relation. The mechanism might malfunction even if the lever comes slightly out of position.

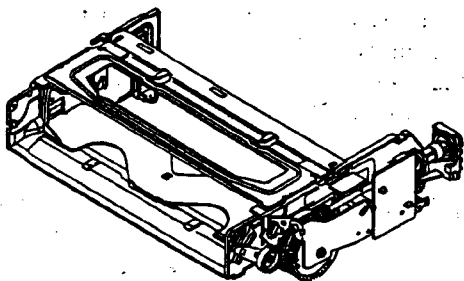


Figure 1-2 (a).

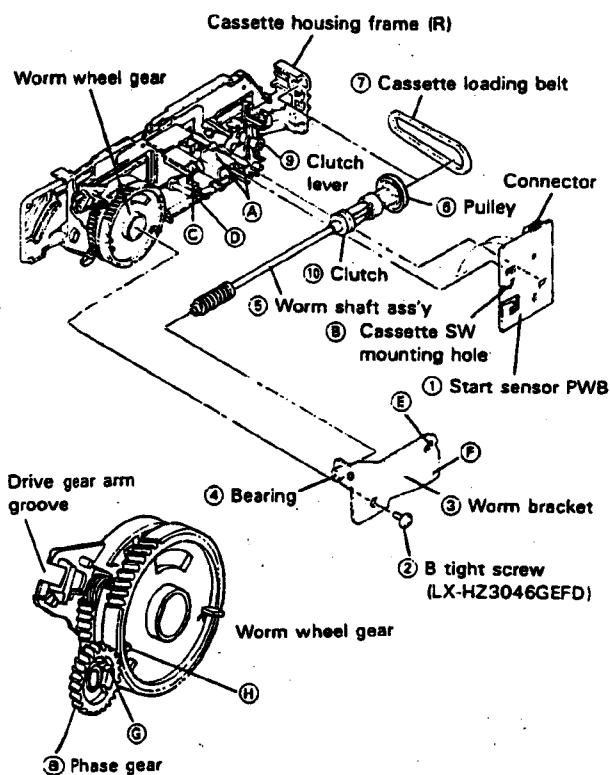


Figure 1-2 (b).

● Reassembly of drive gear (Fig.1- 3)

1. Pass the tip ③ of the drive gear spring (R) ② through the square hole ④ of the drive gear (R) ① to the hook the spring in position.
2. Hook one end ① of the reciprocating spring ③ to the catch ⑤ of the drive gear (R) ①.
3. Hook the other end ② of the reciprocating spring ③ to the catch ⑥ of the worm wheel ④.
4. Fit the drive gear (R) ① to the worm wheel ④ so that the catch ⑤ and boss ⑦ on the drive gear (R) are exactly in the square hole ⑧ and round hole ⑨, respectively, in the worm wheel.

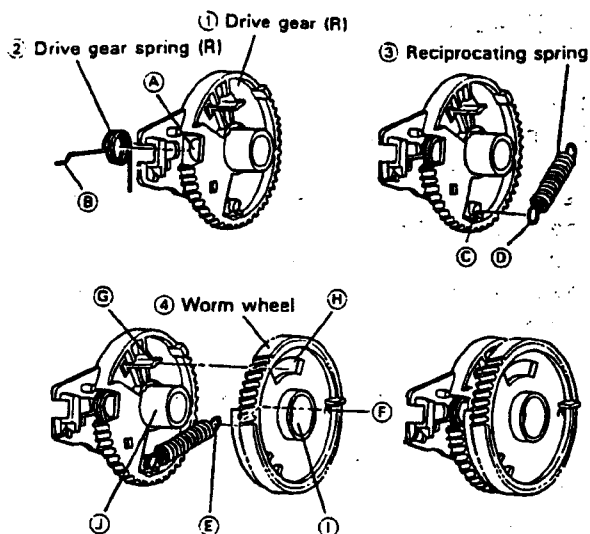


Figure 1-3.

REPLACEMENT OF CASSETTE LOADING BELT

● Replacement (Fig. 1-4)

1. Remove the start sensor PWB and worm bracket from the cassette housing frame (R).
2. Remove the worm shaft assembly, pulley and cassette loading belt from the cassette housing frame (R).
3. Replace the cassette loading belt with a new one.

Notes:

1. Do not overtighten the B tight screw which holds the worm bracket in position. The specified tightening torque is $5.0 \pm 0.5 \text{ kg. cm}$.
2. Make sure that the cassette loading belt, being applied in the cassette housing frame (R), is free from grease. If stained with grease, clean the belt with the specific cleaning liquid.
3. Finally check the clutch switching lever for its specified points.

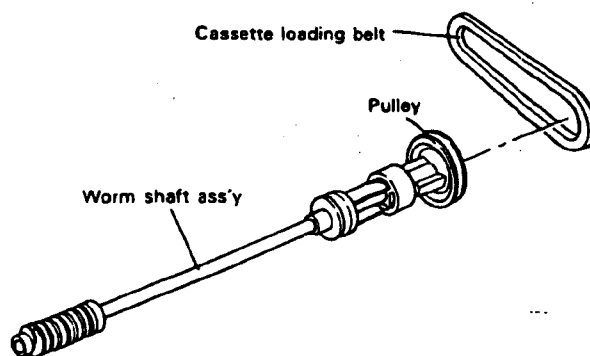


Figure 1-4.

CHECKING THE CLUTCH SWITCHING LEVER

● Checking (Fig. 1-5)

When removing and attaching the clutch switching lever from and to the mechanism chassis, check to see if the lever is in the position as shown below. If out of this position, malfunction might result.

1. First make sure that the rib **A** of the drive gear (R) **1** and the tip **B** of the switch lever **2** are in their correct positions.
2. Check also that the rib **C** of the cassette housing frame (R) and the catch **D** of the clutch lock lever **3** are in their proper positions.
3. Finally be sure that the positional relations between the clutch lever **4** and the clutch **5**, as well as between the clutch **5** and the pulley **6**, are as specified.

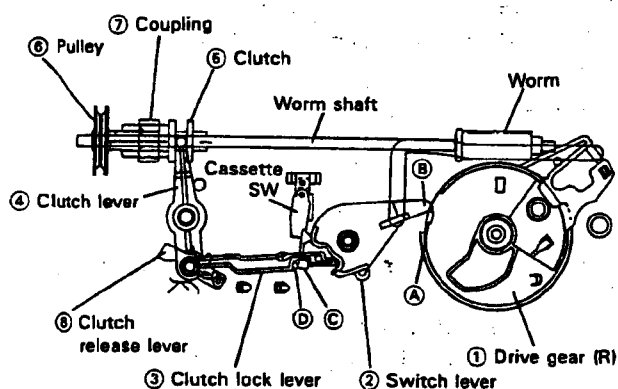


Figure 1-5.

● Resetting (Fig. 1-6)

Take the following steps to reset the clutch **5** if it is unlocked or if the switch lever **2** and clutch lock lever **3** are unlocked.

1. Turn the coupling **7** clockwise (as viewed from the front of the set) until the slider comes to the position indicated below.

Note: Notice that the slider is equipped with a lock mechanism. Unlock the slider, therefore, before shifting the slider.

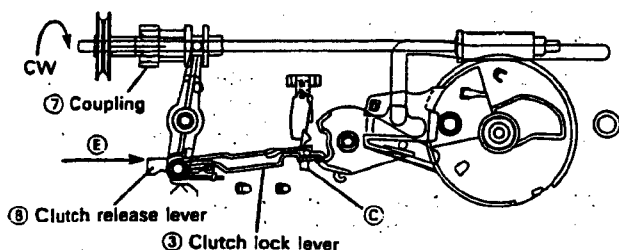


Figure 1-6.

2. Now push the clutch release lever **8** in the direction of arrow **E** by hand until the clutch lock lever **3** becomes tightly locked by the part **C** of the cassette housing frame (R).
 3. Then turn the coupling **7** counterclockwise until the slider reaches the cassette insertion opening and the reciprocating spring is activated.
- Note:** There is no need to lock the slider. Just keep shifting the slider.

REPLACEMENT OF LOCK RELEASE LEVER

● Removal (Fig. 1-7)

1. Turn the coupling clockwise until the slider **1** comes to the cassette down position.
- Note:** Before shifting, unlock the slider.
2. Slightly widen the cassette housing frames (R) and (L) to unhook the parts **A** of the slider holders (R) and (L) off the grooves of the above frames.
 3. Press the catch **B** on the slider holder (R) **2**, and let the slider **1** go off this holder in the direction of arrow **C**.
 4. Take the lock release lever ass'y **3** out of the slider holder (R) **2**.

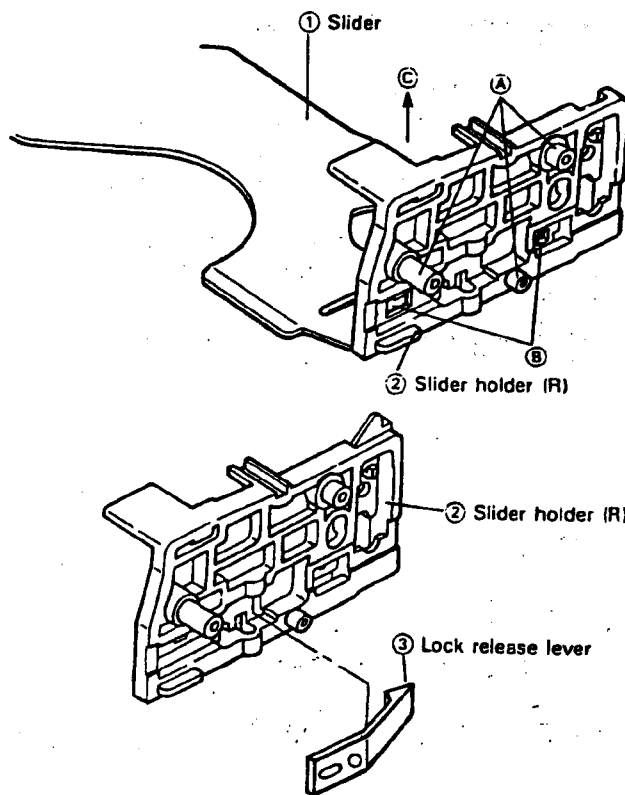


Figure 1-7.

● Reassembly (Fig. 1-7)

1. Attach the lock release lever ass'y ③ to the slider holder (R) ②.
2. Fit the slider holder (R) ② to the slider ①.
3. Slightly widen the cassette housing frames (R) and (L), and set the parts ④ of the slider holders (R) and (L) to the grooves of the cassette housing frames (R) and (L).

Note: Make sure of the following fitting: Fitting between the parts ④ of the slider holders (R) and (L) and the grooves of the cassette housing frames (R) and (L), as well as between the drive gear arms and the slider holders (R) and (L).

4. Turn the coupling counterclockwise until the slider ① comes to the cassette insertion opening.

TO RUN A TAPE WITHOUT THE CASSETTE HOUSING CONTROL ASSEMBLY

1. Open the lid of a cassette tape by hand and hold it with a piece of vinyl tape.
2. Set the cassette tape in the tape mechanism. Then, stabilize the cassette tape with a weight (500g or less).

Note: The weight should not be more than 500g.

REMOVAL AND HEIGHT ADJUSTMENT OF REEL DISKS

● Removal of supply reel disk:

1. Remove the cassette housing control assembly.
2. Set the mechanism in the playback mode with no cassette tape in place. Unplug the power cord.
3. Remove the tension band ⑧.
4. Unscrew the screw ⑩ and release the cassette housing control ground spring ⑫ off the reel disk catch ①.
5. Release the supply reel disk catch ① and back tension lever ②. Pull out the supply reel disk ③ upward.

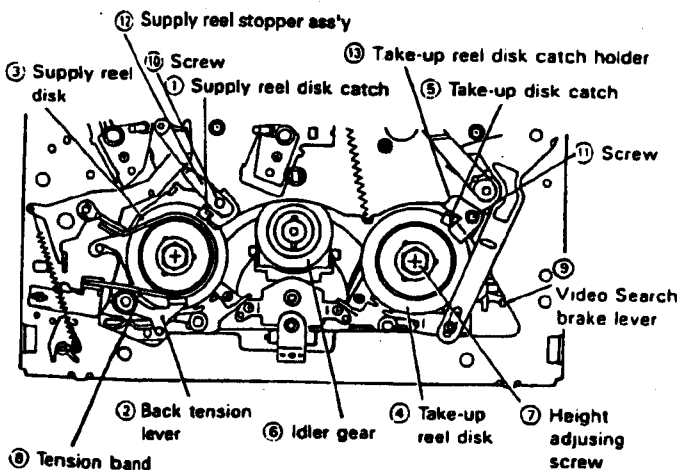


Figure 1-8.

● Removal of take-up reel disk:

1. Remove the cassette housing control assembly.

2. Set the mechanism in the playback mode with no cassette tape in place. Unplug the power cord.
3. Unscrew the screw ① and release the take-up reel disk catch holder ③ off the reel disk catch ⑤.
4. Release the take-up reel disk catch ⑤. Pull out the take-up reel disk ④ upward.

Notes:

1. After replacing either of the reel disks, be sure to perform the height adjustment procedure.
2. Take care not to deform the tension hand.
3. Be careful not to deform the back tension lever, main supply / take - up brake levers, video search brake lever and auxiliary fast forward brake. (See pages 4 and 5.)
4. Check the tension pole position. (See pages 15.)
5. Be careful not to damage the supply reel disk, take-up reel disk and idler gear ⑥.
6. Whenever replacing, clean and lubricate the reel disk shaft.

● Reassembly of supply reel disk:

1. Clean the reel disk shaft and apply oil (high quality spindle oil) to it, then install a new supply reel disk onto the shaft.
2. Replace the cassette housing control ground spring ⑫ in position and tighten up the screw ⑩.
3. Replace the tension band ⑧.
4. Adjust the reel disk height by using the master plane and reel disk height adjusting jig.

● Reassembly of take-up reel disk:

1. Clean the reel disk shaft and apply oil (high quality spindle oil) to it. Then, release the video search brake lever and install a new take - up reel disk onto the shaft.
2. Replace the take-up reel disk catch holder ③ in position and tighten up the screw ①.
3. Adjust the reel disk height by using the master plane and reel disk height adjusting jig.

Notes:

1. During removal and reassembly, be careful not to damage the reel disks, reel shafts, idler gear and brake levers.
2. After reassembly, check the back tension in video search rewind mode (see page 14) and checking the brake torque (see page 16)

HEIGHT ADJUSTMENT

1. Remove the cassette housing assembly, and place the master plane onto the mechanism unit as shown in Fig.1-9 (a), taking care not to hit the drum.
2. Ensure that the reel disk is lower than the part ④ but higher than the part ⑤ of Fig. 1-9 (b), by using the reel disk height adjusting jig. If the height is not correct, adjust the height adjusting screw.

Note: Whenever replacing the reel disk, perform the height adjustment.

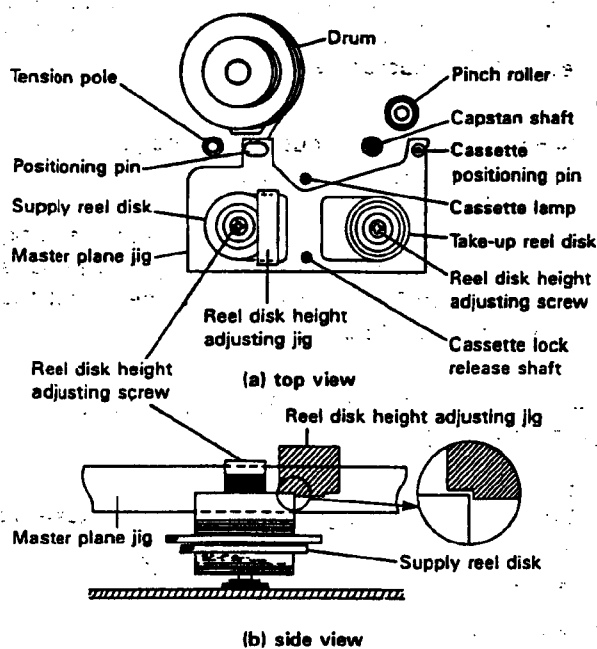


Figure 1-9.

CHECKING AND ADJUSTMENT OF TAKE-UP TORQUE IN FAST-FORWARD MODE

Notes:

1. When setting the torque gauge on the take-up reel disk and pushing the fast-forward button to start the reel disk turning, take care that the torque gauge does not fly off.
2. The checking and adjustment should be carried out without a video cassette tape in place.

• Checking

1. Remove the cassette housing assembly.
2. Place the torque gauge on the take-up reel disk and push the fast-forward button to place the unit in the fast-forward mode.
3. Turn the torque gauge slowly (one rotation every 2 to 3 seconds) by hand in the take-up direction and check that it indicates 700 g.cm or more.

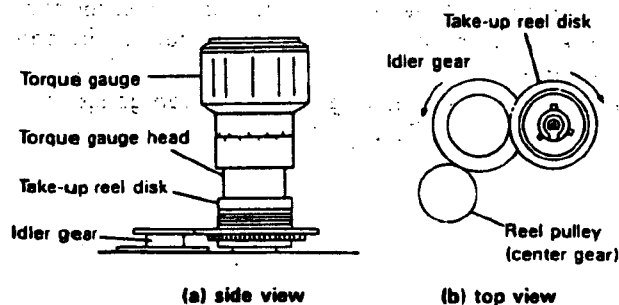


Figure 1-10.

• Adjustment

If the take-up torque is outside the specified range, clean the capstan D.D. motor pulley, reel belt and reel pulley with cleaning liquid, then recheck the torque.

If the take-up torque is still out of specification, replace the reel belt.

CHECKING AND ADJUSTMENT OF TAKE-UP TORQUE IN REWIND MODE

Notes:

1. When setting the torque gauge on the supply reel disk and pushing the rewind button to start the reel disk turning, take care that the torque gauge does not fly off.
2. When checking the take-up torque, do not keep the reel disk locked for a longer time.

• Checking

1. Remove the cassette housing assembly.
2. Place the torque gauge on the supply reel disk and push the rewind button to place the unit in the rewind mode.
3. Turn the torque gauge slowly (one rotation every 2 to 3 seconds) by hand in the take-up direction and check that it indicates 700 g.cm or more.

• Adjustment

If the take-up torque is outside the specified range clean the capstan DD motor pulley, reel belt and reel pulley with cleaning liquid, then recheck the torque.

If the take-up torque is still out of specification, replace the reel belt.

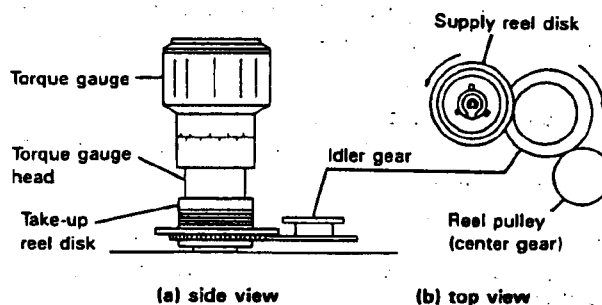


Figure 1-11.

CHECKING OF TAKE-UP TORQUE IN PLAY-BACK MODE

• Checking

Load a cassette torque meter (JiGVHT-063) into the unit and push the record button to place the unit in the record mode. Then check that the torque is as specified;

torque: 95 ± 30 g.cm

Note:

The measured torque fluctuates due to the rotational deviation of the reel drive unit. Use the center of the fluctuating range as the measured value.

1. If the take-up torque in playback mode is outside the specified value, replace the take-up reel disk.
2. Push the record button to place the unit in the record mode, and check that the take-up torque is within the specified range.

CHECKING OF TAKE-UP TORQUE IN VIDEO SEARCH REWIND MODE

● **Checking**

Load a cassette torque meter (JiGVHT-O63) into the unit and push the play and video search rewind buttons to place unit in the video search rewind mode.

Then check that the torque is as specified;
torque in video search rewind mode : $170 \pm 40 \text{ g.cm}$

Note:

The measured torque fluctuates due to the rotational deviation of the supply reel disk. Use the center of the fluctuating range as the measured value.

1. If the take-up torque in video search rewind mode is outside the specified range, replace the supply reel disk.

CHECKING THE FAST FORWARD BACK TENSION

Note:

Set the torque gauge securely on the supply reel disk; if the torque gauge is loose above the reel disk, an inaccurate measurement will result.

● **Checking**

1. Remove the cassette housing assembly.
2. Push the fast forward button to place the unit in the fast forward mode.
3. Place the torque gauge on the supply reel disk, and turn it clockwise very slowly (one rotation every 2 to 3 seconds) and check that the torque is within $15 \pm 5 \text{ g.cm}$.

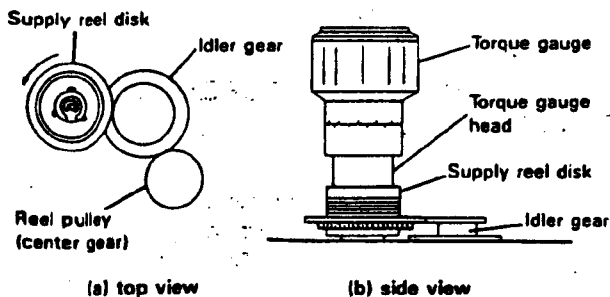


Figure 1-12.

CHECKING THE REWIND BACK TENSION

Note:

Set the torque gauge securely on the take-up reel disk; if the torque gauge is loose above the reel disk, an inaccurate measurement will result.

● **Checking**

1. Remove the cassette housing assembly.
2. Push the rewind button to place the unit in the rewind mode.
3. Place the torque gauge on the take-up reel disk, and turn it counterclockwise very slowly (one rotation every 2 to 3 seconds) and check that the torque is within $15 \pm 5 \text{ g.cm}$.

CHECKING THE VIDEO SEARCH REWIND BACK TENSION

Note:

Set the torque gauge securely on the take-up reel disk; if the torque gauge is loose above the reel disk, an inaccurate measurement will result.

● **Checking**

1. Remove the cassette housing assembly.
2. Push the play button to place the unit in the playback mode.
3. Push the video search rewind button to place the unit in the video search rewind mode.
4. Place the torque gauge on the take-up reel disk, and turn it counterclockwise very slowly (one rotation every 2 to 3 seconds) and check that the torque is within $40 \pm 10 \text{ g.cm}$.

CHECKING THE PINCH ROLLER PRESSURE

1. Remove the cassette housing assembly.
2. Push the play button to place the unit in the playback mode.
3. Hook the tension gauge adapter around the pinch roller shaft.
4. Using a tension gauge, pull the pinch roller in the direction of arrow $\Rightarrow$ ④ so that the pinch roller moves away from the capstan shaft.
5. Gradually release the pressure in the direction of arrow $\Rightarrow$ ⑤ to allow the pinch roller to touch the capstan shaft. When the pinch roller just touches the capstan shaft, read the indication on the gauge.
6. Check that the reading of the tension gauge is in the range of 1000 to 1200 gr.

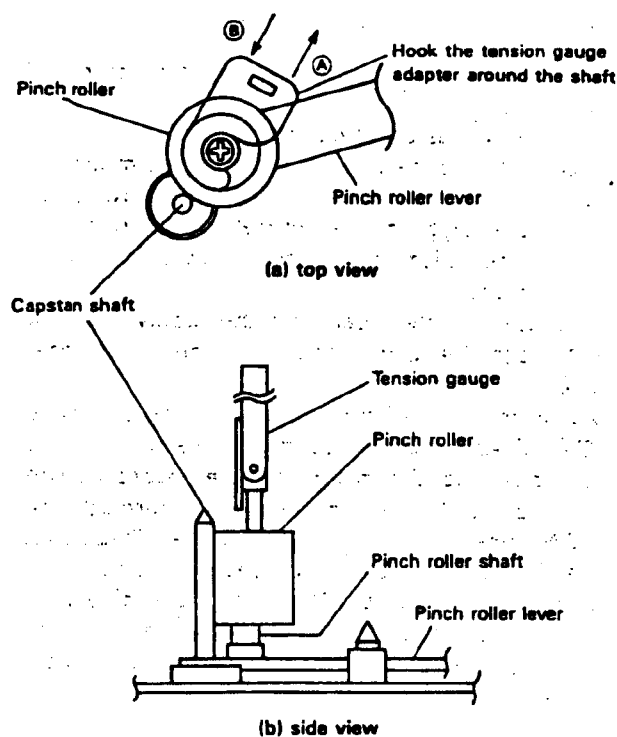


Figure 1-13.

ADJUSTMENT OF TENSION POLE

● Position checking (Fig. 1-14)

1. Remove the cassette housing assembly.
2. Set a video cassette tape and push the record button to place the unit in the record mode.
3. The pole bases (see page 4; item 19 and 27.) operate to bring the tape outside the cassette housing and simultaneously the tension pole moves to the left, loading the tape. At that time (loading mode), check the position of the tension pole.

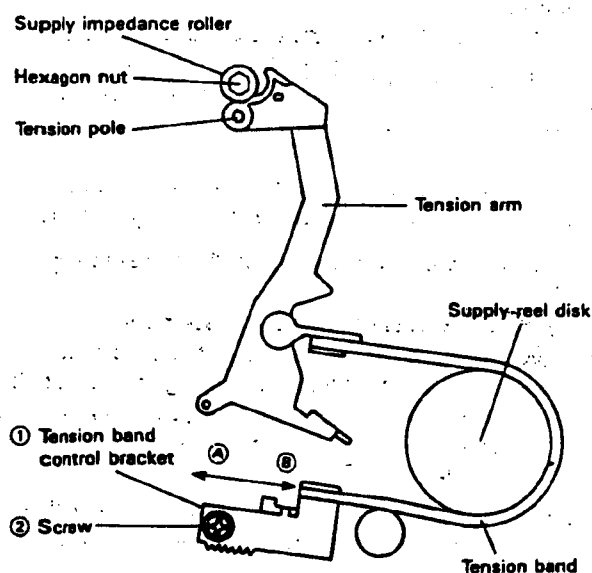


Figure 1-14.

4. At the top of the tape (E-180), check that the tension pole's center is aligned with the supply impedance roller's center.
5. Check that the tape is neither curled against the flange of the supply impedance roller nor mounted over it.
6. During the video search rewind mode with no cassette tape in place, check the supply reel disk is free of the tension band.

● Position adjustment (Fig. 1-15)

1. If the tension pole is at the right of the supply impedance roller's center, shift the tension band control bracket ① in the direction of arrow → ③, and tighten the screw ②.
2. If the tension pole is at the left of the supply impedance roller's center, shift the tension band control bracket ① in the direction of arrow → ④, and tighten the screw ②.

ADJUSTMENT OF RECORD/PLAYBACK BACK TENSION

● Checking

1. Remove the cassette housing assembly.
2. Put a torque cassette meter into the unit.
3. Push the record button to place the unit in the record mode. Check that the reading of the cassette meter is 23 to 28 g.cm.
4. Make sure the video cassette tape is wound over the retaining guide.
5. Make sure that the tape is not slack nor damaged at both ends.

● Adjustment (Fig. 1-15)

1. If the back tension is lower than specified, move the tension spring hook plate ① in the direction of arrow → ④ so that the protuberance behind be tight in the hole.
2. If the back tension is higher than specified, move the tension spring hook plate ① in the direction of arrow → ③ so that the protuberance behind be tight in the hole.

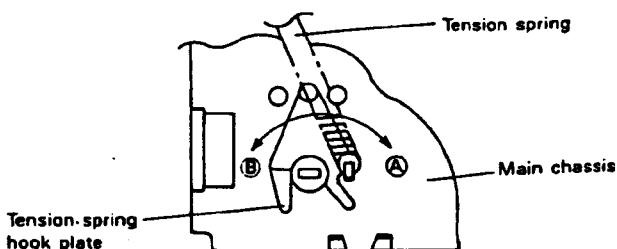


Figure 1-15.

Figure 1-16. Not used.

CHECKING THE BRAKE TORQUE

A) Checking the brake torque at the supply side.

• Checking

1. Remove the cassette housing assembly.
2. Check that the mechanism is in the stop mode.

Note: The stop mode is brought about by unplugging the power cord with the mechanism in the fast forward or rewind mode.

3. Separate the idler gear from the supply reel disk and place the torque gauge on the supply reel disk.
4. Slowly rotate the torque gauge in the clockwise (CW) direction of the supply brake so that the reel disk and the gauge needle rotate at the same speed. Do the same in the counterclockwise (CCW) direction of the supply brake. Check that the values are within the specified range (CW direction = 280 to 720 g.cm, CCW direction = 110 to 230 g.cm) and that the brake torque in the CW direction is at least twice as high as that in the CCW direction.

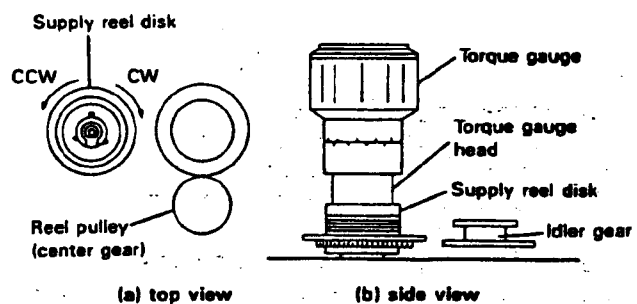


Figure 1-17.

• Adjustment

1. If the supply brake torque is outside the specified range (CW direction = 280 to 720 g.cm, CCW direction = 110 to 230 g.cm), clean the supply reel disk and brake lever felt, then recheck the torque.
2. If the supply brake torque is still outside the specified range, replace the main brake spring.

B) Checking the brake torque at the take-up side.

• Checking

1. Remove the cassette housing assembly.
2. Check that the mechanism is in the stop mode.

Note: The stop mode is brought about by unplugging the power cord with the mechanism in the fast forward to rewind mode.

3. Separate the idler gear from the take-up reel disk and place the torque gauge on the take-up reel disk.

- Slowly rotate the torque gauge in the CCW direction of the take-up brake so that the reel disk and the gauge needle rotate at the same speed. Do the same in the CW direction of the take-up brake. Check that the values are within the specified range (CCW direction = 280 to 720 g.cm, CW direction = 90 to 200 g.cm) and that the brake torque in the CCW direction is at least twice as high as that in the CW direction.

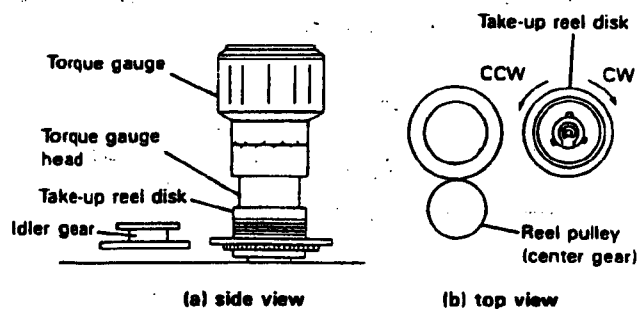


Figure 1-18.

• Adjustment

- If the take-up brake torque is outside the specified range (CCW direction = 280 to 720 g.cm, CW direction = 90 to 200 g.cm), clean the take-up reel disk and brake lever felt, then recheck the torque.
- If the take-up brake torque is still outside the specified range, replace the main brake spring.

REPLACEMENT OF A/C (Audio/Control) HEAD

Note:

After replacement, perform the adjustment of tape drive train. Under any circumstances avoid touching the head (indicated by "→" in Fig. 1-20(c)).

• Replacement (See Figs. 1-19 and 1-20.)

- Loosen the tilt adjusting screw ⑥ by using Phillips screwdriver.
- Remove the azimuth adjusting screw ⑤ with a Phillips screwdriver.
- Remove the A/C head screw ④ with a Phillips screwdriver, paying attention to the spring ⑦ between the A/C head screw ④ and A/C head pedestal.

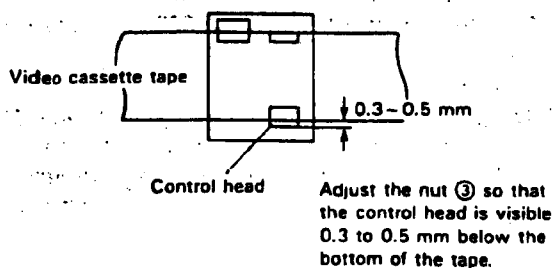


Figure 1-19.

- Remove the A/C head PWB ⑧ soldered to the A/C head assembly, and solder the A/C head PWB ⑧ onto a new A/C head assembly.
- The A/C head assembly ① is attached so that the A/C head arm ② and A/C head pedestal are roughly parallel to each other.

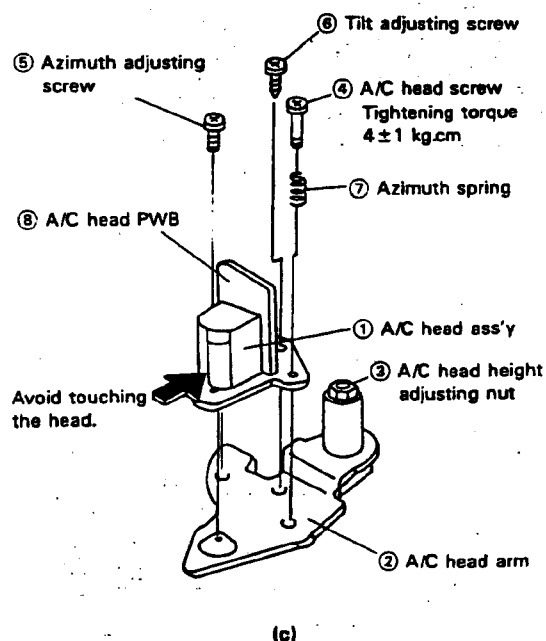
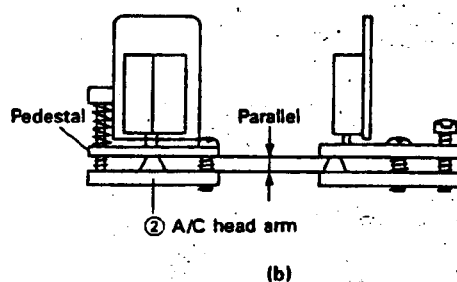
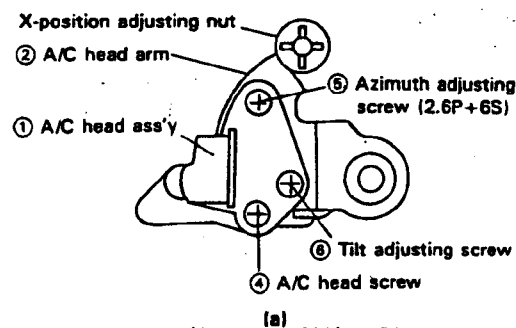


Figure 1-20.

6. Set the A/C head tilt angle according to Fig. 1-22.
7. Play an alignment tape and roughly adjust the height of the A/C head, visually, by turning the A/C head adjusting hexagon nut ③ with the box driver (JiGDRIVER110-7) until the tape comes to the position shown below. (See Fig. 1-19.)
8. Set the mechanism to the loading mode. Place the A/C head tilt adjusting jig on the main chassis as shown in Fig. 1-21. Slowly turn the tilt adjusting screw ⑥ with a Phillips screwdriver until there is no gap between the jig and the A/C head.

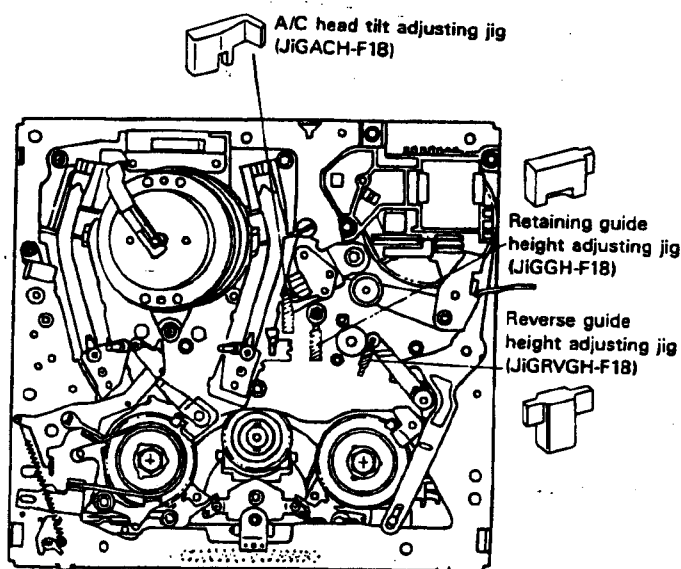


Figure 1-21.

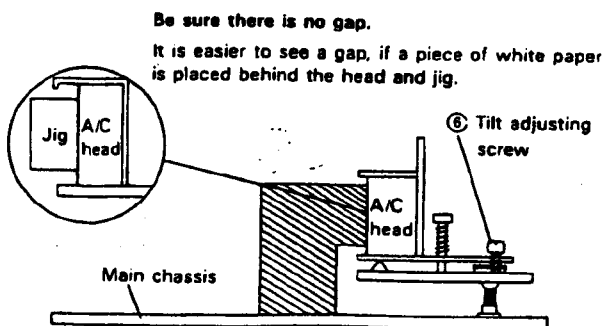


Figure 1-22.

HEIGHT ADJUSTMENT OF RETAINING GUIDE AND REVERSE GUIDE

• Adjustment

1. Before the rough adjustment of tape drive train, check that the retaining guide and reverse guide heights are within the specified values of Fig. 1-23, by using the special jigs.
2. If the retaining guide height is not correct, adjust the height with the box driver (JiGDRIVER110-4).
3. If the reverse guide height is not correct, use the height adjusting washers.

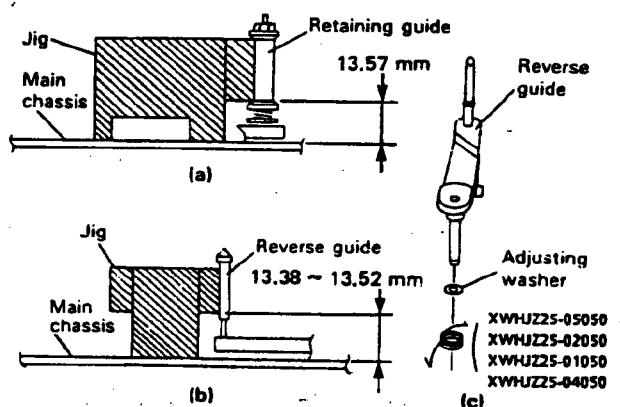


Figure 1-23.

ADJUSTMENT OF TAPE DRIVE TRAIN

1. Check and adjust the position of the tension pole and the back tension. (See pages 15)
2. Set the tilt angle of the A/C head as shown in Fig. 1-22.

Note:

If the A/C head is adjusted, check and set the tilt angle as in the case of replacement.

3. When the above adjustments have been completed, roughly adjust the tape drive train using an alignment tape.

- a. Connect the oscilloscope to the test points for PB chroma output (TP501) and head switching pulse (TP502). Allow the PB CHROMA signal to be triggered by the head switching pulse of TP502.
- b. Loosen the setscrew of the guide roller, and tighten it loosely by using the special bladed screwdriver (JiGDRIVERH-4) to such an extent that the guide roller turns smoothly.
- c. Set the alignment tape (VROCPSV) on the reel disk.

Note:

Attach a 400 to 500g. weight to the cassette tape when a cassette tape is placed on the reel disk with the cassette housing assembly removed.

- d. Place the unit to the playback mode.
- e. Observe the waveform of the PB chroma, and push the (+) or (-) tracking button to check for a flat PB chroma. This adjustment is satisfactory if a flat response is obtained on the waveform of the PB chroma when the (+) or (-) tracking button is pushed. If a flat response cannot be obtained roughly adjust the guide roller using the special bladed screwdriver until the PB chroma output is flat. While keeping the both (+) and (-) tracking buttons down, adjust the X-position adjusting nut so that the PB CHROMA envelope becomes almost maximum. In the case of rough adjustment, pay particular attention to the outlet side (see Fig. 1-24).
- f. Adjust the retaining guide height so that the lower flange of the retaining guide touches the bottom edge of the tape. At that time, check that the tape is not curled nor wrinkled.
4. The A/C head height and azimuth are adjusted after rough adjustment of the tape drive train has been done.
 - a. Use the alignment tape and play back its audio 7kHz signal (monoscope pattern for video signal) and observe the audio output on an oscilloscope.
 - b. Adjust the azimuth adjusting screw so as to obtain the maximum audio output.
 - c. Use the alignment tape and play back its audio 1kHz signal (colour bar for video signal) and slowly rotate the A/C head height adjusting nut with the special box driver so as to obtain the maximum audio output.
 - d. After the height adjustment, use the alignment tape and play back its audio 7kHz signal (monoscope pattern for video signal) again and adjust the azimuth adjusting screw so as to obtain the maximum audio output. After this adjustment, apply glyptal to the screws and nuts to fix them.
5. The final adjustments of tape drive train and X-position are adjusted after adjustment of the A/C head has been completed.
 - a. Connect the oscilloscope to the test points for PB chroma output (TP501) and head switching pulse (TP502). Allow the PB CHROMA signal to be triggered by the head switching pulse of TP502.
 - b. Play back the tape drive train alignment tape (VROCPSV).
 - c. Finely adjust the guide roller's height, observing the envelope on the oscilloscope. Push the (+) or (-) tracking button while adjusting the guide roller, in order to obtain an envelope waveform which is as flat as possible. If the tape is above or below the helical lead, the PB chroma waveform will take the shape shown in Fig. 1-26. Adjust for maximum flatness of the envelope according to the figure.

Note:

Adjustment is made for CH-1 of switching pulse (low level). The broken lines indicate the envelope waveform when the tape does not run properly.

Push the (+) or (-) tracking button to check the envelope waveform.

After adjustment, tighten the setscrew of the guide roller firmly.

Play back the alignment tape (VROCPSV) again in the unloading mode, and make sure that there is no change in the PB chroma output.

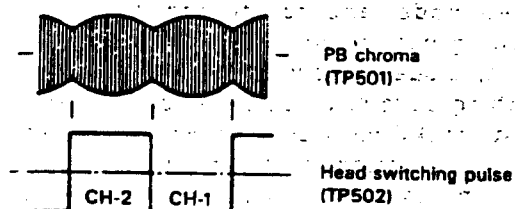


Figure 1-24.

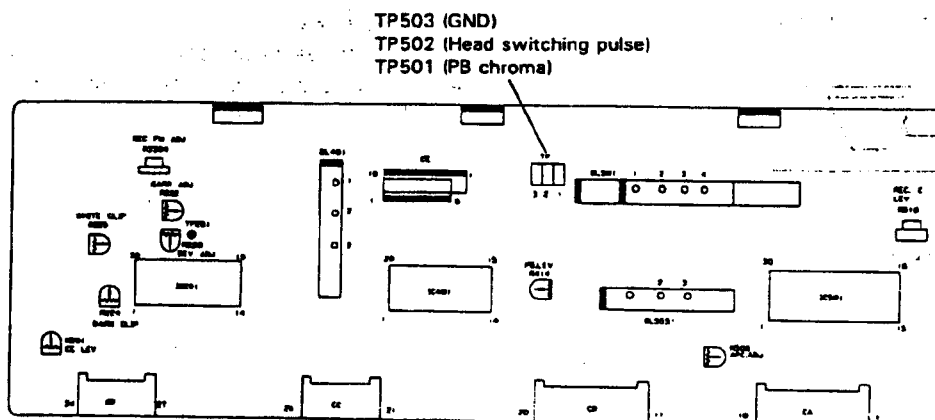


Figure 1-25.

	When the tape is above the helical lead.		When the tape is below the helical lead.	
	Supply side	Take-up side	Supply side	Take-up side
Adjustment	Supply side guide roller rotated in clockwise direction (lowers guide roller) to flatten envelope.	Take-up side guide roller rotated in clockwise direction (lowers guide roller) to flatten envelope.	Supply side guide roller rotated in counterclockwise direction (raises guide roller) to have the tape float above the helical lead. The supply side guide roller is then rotated in the clockwise direction to flatten the envelope.	Take-up side guide roller rotated in counterclockwise direction (raises guide roller) to have the tape float above the helical lead. The take-up side guide roller is then rotated in the clockwise direction to flatten the envelope.

Figure 1-26.

- d. Adjust the retaining guide height so that the lower flange of the retaining guide touches the bottom edge of the tape. At that time, check that the tape is not curled nor wrinkled.
- e. The X-position is adjusted after tape drive train adjustment. Push the (+) and (-) tracking buttons at the same time to set the tracking buttons to the preset mode, and rotate the X-position adjusting nut shown in Fig. 1-27 with the special bladed screwdriver for maximum switching pulse low side envelope, and then adjust the A/C head position. Now adjust the play back switching point to $6.5 \pm 0.5H$. Check the flatness of envelope and sound by selfrecording.

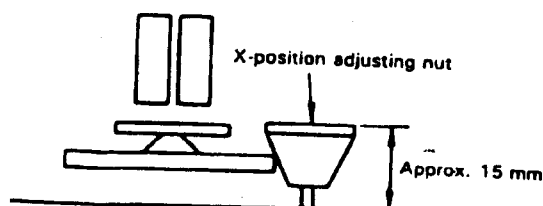
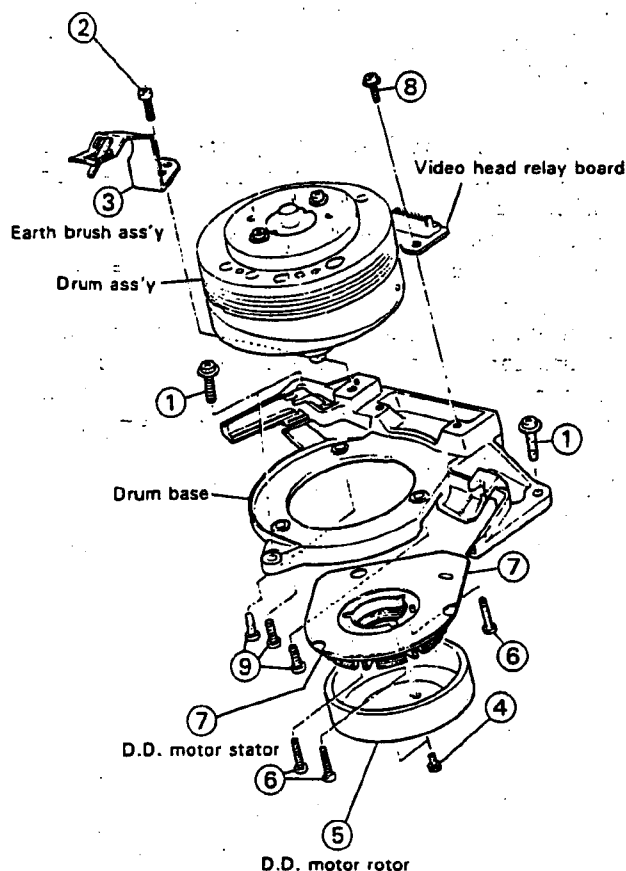


Figure 1-27.

REPLACEMENT OF DRUM ASSEMBLY

• Removal

1. Remove the head amp. PWB from the video head relay board.
2. Remove the bottom board (Ref. No ④ in the Cabinet Parts Diagram).
3. Remove the D.D. drum motor connector (ME).
4. Loosen the Drum-base mounting screws ① and remove the drum ass'y from the mechanism chassis.
5. Loosen the Earth brush ass'y mounting screw ② and remove the Earth brush ass'y ③.
6. Loosen the two D.D. motor rotor mounting screws ④ and remove the D.D. motor rotor ⑤.
7. Loosen the three D.D. motor stator mounting screws ⑥ and remove the stator ⑦.
8. Remove the two video head relay board mounting screws ⑧.
9. Loosen the three drum ass'y mounting screws ⑨ and remove the drum ass'y from the Drum-base.

**Note:**

Secure the D.D. rotor assembly so that the installation positioning holes in the D.D. rotor assembly and lower drum match.

Figure 1-28.

REPLACEMENT OF D.D. (DIRECT DRIVE) MOTOR

Note:

Put the unit in the cassette eject position.

● **Removal**

1. Remove the six screws from the bottom panel and remove the bottom panel.
2. Disconnect the drum D.D. motor lead connector.
3. Remove the two screws ① which hold the D.D. rotor assembly in place, using a Phillips screwdriver.
4. Remove the D.D. rotor assembly.
5. Remove the three screws ② which hold the D.D. stator assembly in place, using a Phillips screwdriver.
6. Remove the D.D. stator assembly.

● **Reassembly**

1. Place the D.D. stator assembly on top of the lower drum.
2. Secure the D.D. stator with the three screws ② using a Phillips screwdriver.

Note:

Be careful not to scratch the core, windings or Hall device.

3. Install the D.D. rotor assembly onto the drum shaft.

Note:

Install the assembly directly onto the direction of the shaft. (Refer to Fig. 1-29 for the installation direction.)

4. Secure the D.D. rotor assembly with the screws ①.
5. Connect the drum D.D. motor lead connector.
6. Install the bottom panel with six screws.

Note:

Be careful not to damage the upper drum or the video head.

7. After replacement of the D.D. motor as shown above, proceed with the adjustment of the playback switching point.

Notes:

1. Be careful not to damage the upper drum or the video head.
2. Be sure that the Hall device and the D.D. stator assembly are not damaged by the D.D. rotor assembly or other parts.

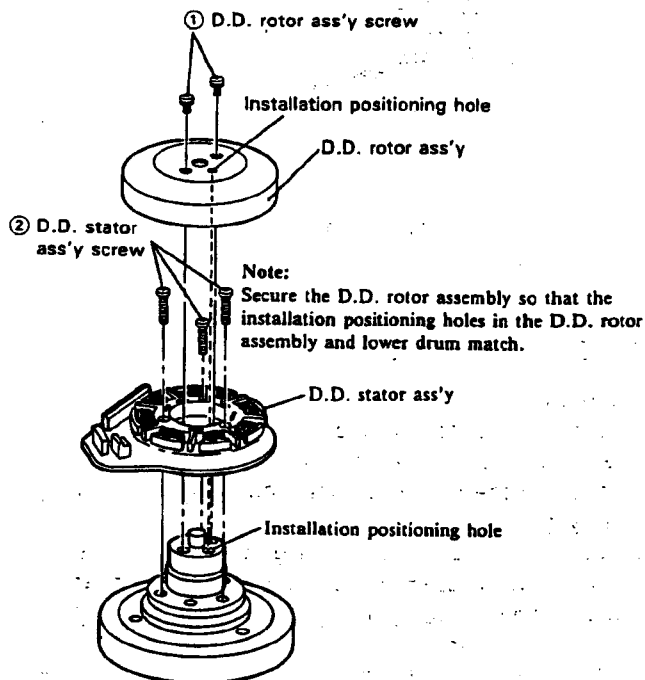


Figure 1-29.

REPLACEMENT OF THE CAPSTAN D.D. (DIRECT DRIVE) MOTOR

• Removal

1. Remove the FFC ① from the capstan D.D. motor control PWB ②.
2. Remove the three screws ③, and remove the capstan D.D. motor ④ from the main chassis.

• Reassembly

1. Mount the capstan motor on the main chassis while making sure not to allow the capstan shaft to hit the main chassis, and attach it with the three screws ③.
2. Insert the FFC ① into the capstan D.D. motor control PWB ②.

Notes:

1. After installing the capstan D.D. motor, be sure to rotate the capstan motor and check the movement.
2. Check and adjust the servo circuit.

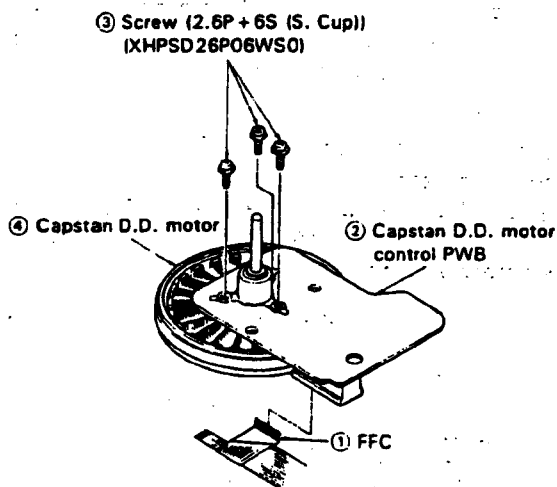


Figure 1-30.

REMOVAL AND REASSEMBLY OF THE LOADING GEAR BLOCK

• Removal

1. Remove the slow brake spring ①, slow brake lever ② and slow brake cap ③.
2. Take out the E ring ④ first and then the loading relay gear ⑤.
3. Rotate the take-up loading gear ⑥, take-up loading arm assembly ⑦, supply loading gear ⑧ and supply loading arm assembly ⑨ slightly in the loading direction, and take them all out.
4. Finally remove the E ring ⑩ and relay gear drive lever ⑪.

• Reassembly

1. Take the reverse steps of the removal.
2. In reassembling, match the tally marks on the gears, as shown in Fig. 1-31

Note:

1. When reassembling, apply grease to the following points; all the gear teeth, all the gear shafts, and the cam groove of loading relay gear which the relay gear drive lever pin comes in.
2. Be careful not to deform the supply/take-up loading arms.
3. Be careful not to stain the felt of the slow brake.
4. Be also careful to keep the outer surface of the capstan D.D. motor ⑨ free from dust and dirt. (If stained, the MR (Magnet Resistor) element ⑩ might be damaged.)
5. Reshape the anti-fall hooks of the slow brake, supply/take-up loading gears as required. Avoid reshaping too much. Do not forget to place the slow brake cap in position.

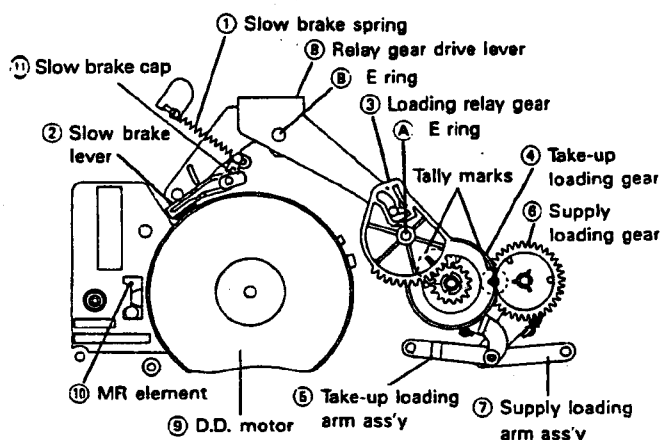


Figure 1-31.

REMOVAL AND REASSEMBLY OF LOADING BLOCK

• Removal

1. Remove the leads and the cassette loading belt from the loading block.
2. Unscrew the three screws ③, and pull up and remove the loading block.

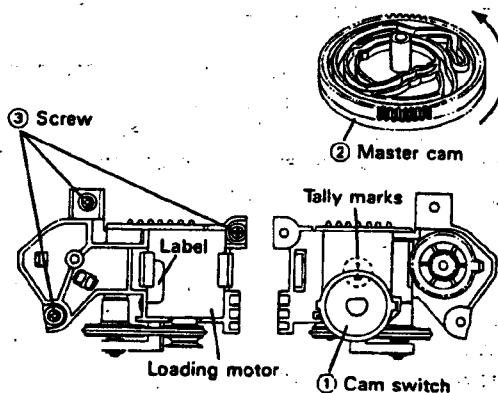


Figure 1-32.

• Reassembly

1. Turn the master cam ② all the way counter-clockwise.
2. Match the tally mark on the cam switch ① with the mating mark. Fit the loading block and the master cam with each other. Tighten up the three screws.
3. Finally connect the leads and apply the cassette loading belt.

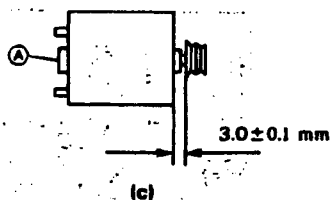
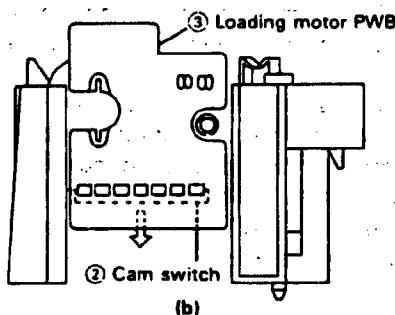
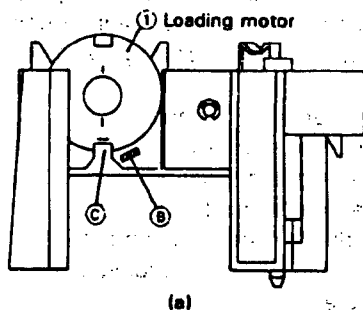
Notes:

1. Be careful not to scratch the gear.
2. Be careful not to stain the belt. If dirty, clean it up.

REPLACEMENT OF LOADING MOTOR

• Removal

1. Remove the loading block.
2. Undo the loading belt.
3. Unsolder the leads from the loading motor ①.
4. Unlock the left and right catches of the cam switch ② off the loading block. Take out the loading block PWB ③.



Note:

1. Press-fit the loading motor pulley to the dimension specified in Fig. 1-33(c).
2. Keep the pressure on the part (A) (see above) less than 5 kg.

Figure 1-33.

5. Put the tip of a bladed screwdriver or the like into the opening ⑧ shown in Fig. 1-33 (a). Pry up the back end of the loading motor ① and take out the motor.

• Reassembly

1. Place the loading motor so that its label is visible as shown in Fig. 1-32.

Note:

Make sure that the screw hole at the motor shaft and the protuberance on the loading block are properly engaged and that the notch at the loading motor end and the part ⑥ of the loading block are also fitted together.

2. Set up the loading block PWB ③ and the cam switch ② in position.
3. Resolder the leads to the loading motor.
4. Finally place the loading block in position.

REPLACEMENT OF MASTER CAM

• Removal

1. Remove the loading block.
2. Remove the E ring ④ and then the half-loading reciprocating lever ①.

Note:

There is no need to take out the half-loading drive lever.

3. Remove the E ring ⑤ first and then the pinch roller lever ②.
4. Finally pull out the master cam ③ upward.

• Reassembly

1. Place the relay gear drive lever in the unloading state as shown in Fig. 1-31.
2. Set the relay shifter lever ④ to the main chassis; the shifter lever should be adjusted to the reverse guide spring hole in the main chassis. Then place the master cam so that the cut-off part of the boss ⑥ should face the direction of arrow → ⑦.

3. Place the half-loading reciprocating lever ① so that its cam follower comes in the outermost cam groove. Now attach the E ring ④.

Note:

Preferably hook the half-loading reciprocating spring ⑤ before attaching the lever. It is easier to set up.

4. Turn the master cam ③ somewhat clockwise until the pinch roller lever's cam follower comes into the master cam's groove ⑧. Then attach the E ring ⑤.
5. Rotate the master cam ③ by hand to make sure all the four levers (relay gear drive lever, relay shifter lever, half-loading reciprocating lever and pinch roller lever) are right in the cam grooves.
6. Finally set up the loading block.

Notes:

1. Be careful not to scratch the teeth and grooves of the master cam.
2. Before placing the loading block, be sure to rotate the master cam by hand to make sure the levers are right in their respective positions. Otherwise the master cam and the levers might get damaged when the motor starts.
3. Apply grease to the master cam's grooves and teeth.

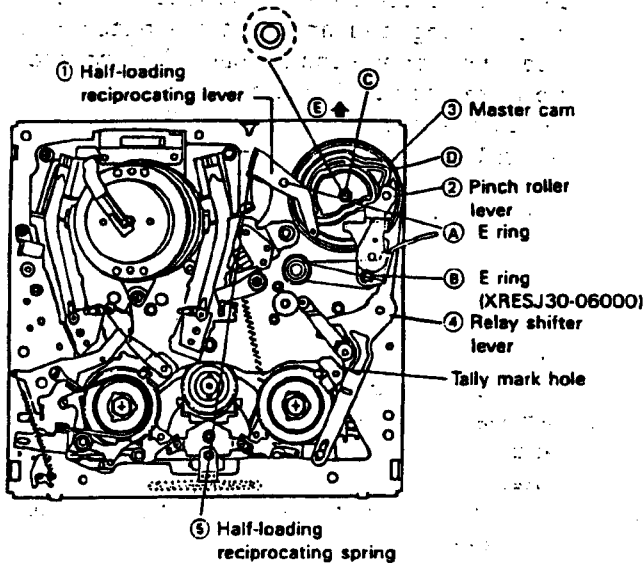


Figure 1-34.

HOW TO UNLOAD THE CASSETTE MANUALLY

1. To unload the cassette the common way.

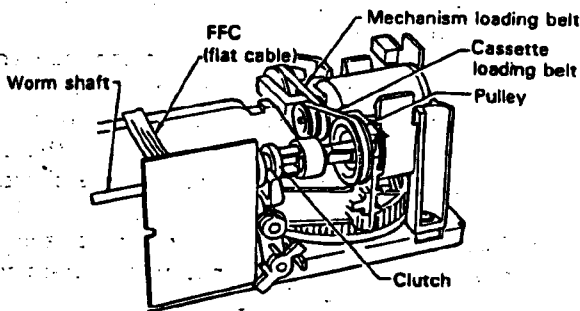


Figure 1-35.

- (1) Turn the pulley in the direction of arrow.
(By this, the clutch becomes engaged to eject the cassette.)

Notes:

- Do not touch the worm shaft. Just turn the pulley, and the worm shaft will rotate together.
- Carefully turn the pulley if the unit is equipped with the half-loading lever.
Otherwise the cassette tape may get loose.

- (2) To unload the cassette by activating the cassette housing control.

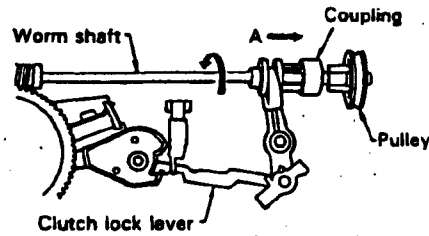


Figure 1-36.

- (1) Remove the cassette loading belt.
- (2) Turn the coupling in the direction of arrow until the cassette comes up.
- (3) Press the clutch in the direction A to get the clutch engaged.
- (4) Now turn the worm shaft all the way in the direction of arrow to take out the cassette.

Notes:

- Carefully turn the worm shaft if the unit is equipped with the half-loading lever.
Otherwise the cassette tape may become loose.
 - If the second method (activating the cassette housing control) is carried out, the cassette housing control and the mechanism come out of phase from each other. Take the following steps to get in phase with the cassette housing control.
- (1) Remove the cassette loading belt and the flat cable.
 - (2) Turn the power on. The mechanism will automatically be in the eject mode and get in phase with the cassette housing control.
 - (3) Unplug the power cord.
 - (4) Make sure the cassette housing stays in the eject mode. Apply the cassette loading belt and connect the flat cable.
 - (5) Plug in the power cord. Finally load the cassette and eject it to make sure the motion is perfect.
(This loading and ejection makes for proper phasing.)
- If the tape has not been fully rewound, remove the bottom panel of the unit and turn the capstan D.D. motor rotor or the reel pulley in the direction of arrow B to wind up the tape.
Now you can take out the cassette without damaging the tape.
 - Before taking the above measure, be sure to unplug the power cord.

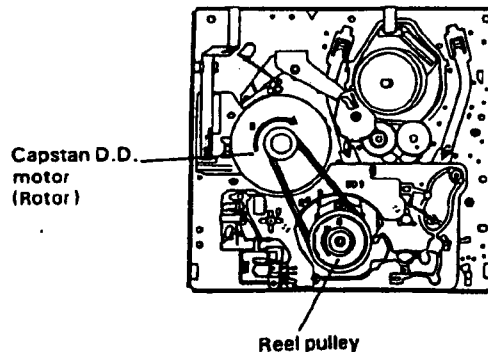


Figure 1-37.

REMOVAL AND REASSEMBLY OF CASSETTE HOUSING CONTROL ASSEMBLY

Notes:

1. During removal and reassembly of the cassette housing, take care not to hit the nearby guide pins and the drum.
2. Do not forget to remove the AC power supply plug from the wall outlet at removal and reassembly.

Removal

1. Press the cassette eject button, and remove the cassette from the housing.
2. Pull off the connector on the right side of the cassette housing.

Note:

Be careful not to break the leads of the connector.

3. Remove two screws fixing the cassette housing.
4. Shift the cassette housing toward the arrow $\downarrow$ B direction shown in Fig. 1-4 and take it out upwards..

Reassembly

1. Connect the connector on the right side of the cassette housing.
2. Insert the hooks of the cassette housing into main chassis, shift it toward the arrow $\downarrow$ A, and fix it temporarily. Check if the cassette housing is placed in the right position and fix it with two screws (XHPS330P06WS0).
3. Arrange the leads of the connector properly on the right side of the cassette housing.

Cassette housing fixing screws

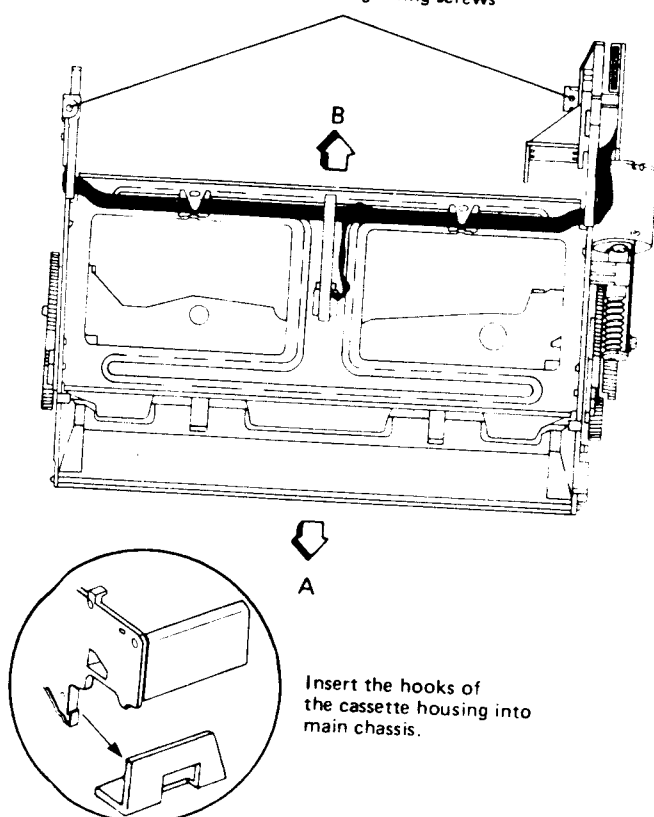


Figure 1-4.

WHEN RUNNING A TAPE WITHOUT CASSETTE HOUSING

1. Open the cover of a cassette tape by hand and hold it open with a piece of vinyl tape.
2. Set the cassette tape in the tape mechanism. Then stabilize the cassette tape with a weight (500g or less).

Note:

The weight should not be more than 500g.

REPLACEMENT AND HEIGHT ADJUSTMENT OF REEL DISKS

Removal of supply reel disk

1. Remove the tension band 7, and tension arm 8.
2. Remove the slit washer 1.
3. Lift the supply reel disk 3 upwards to remove, and replace.

Removal of take-up reel disk

1. Remove the slit washer 1.
2. Lift the take-up reel disk 4 upwards to remove, and replace.

Notes:

1. After replacing either of the reel disks, be sure to perform it's height adjustment.
 2. Take care not to damage to the tension band 7.
 3. Be careful not to deform the auxiliary brake lever, supply brake lever, take-up brake lever and universal brake lever.
 4. Check the tension pole position (see Fig. 1-11).
- * At the time, remove the height adjusting washer 5 and clean it.

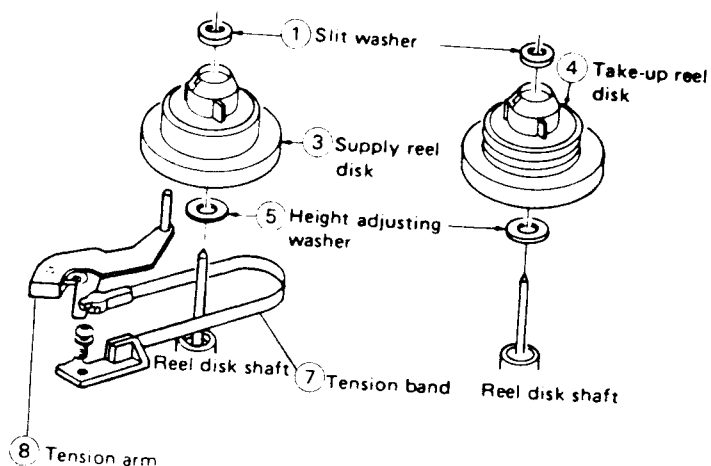


Figure 1-5.

Reassembly of supply reel disk

1. Clean the reel disk shaft and fit the height adjusting washer ⑤.
2. Place the new supply reel disk onto the shaft.
3. Adjust the reel disk height by using the master plane and the reel height adjusting jig.
4. Take the new supply reel disk off, apply oil to the reel disk shaft and again place the disk onto the shaft.

Note:

The reel disk thrust play should be 0.1 to 0.5mm.

5. Fit the slit washer ①.
6. Fit the tension band ⑦, and tension arm ⑧.

Reassembly of take-up reel disk

1. Clean the reel disk shaft and fit the height adjusting washer ⑤.
2. Place the new take-up reel disk ④ onto the shaft.
3. Adjust the reel disk height by using the master plane and the reel height adjusting jig.
4. Take the new take-up reel disk off, apply oil to the reel disk shaft and again place the disk onto the shaft.

Note:

The reel disk thrust play should be 0.1 to 0.5mm.

5. Fit the slit washer ①.

Notes:

1. Take care not to scratch the reel disk or shaft with a slit washer or a tool at removal and reassembly.
2. After reassembly of the take-up reel disk, check the back tension in the video search mode and also the brake torque. (See the instructions on pages 15 and 16).

HEIGHT CHECKING AND ADJUSTMENT OF REEL DISK

1. Remove the cassette housing and set the master plane in the mechanism as shown in Fig. 1-10 (a), taking care not to hit the drum.
2. Insure that the reel disk is lower than the part "A" but higher than part "B" of Fig. 1-6 (b), by using the reel disk height adjusting jig.

If the height is not correct use the height adjusting washers: looseness in backlash on the shaft should not exceed 0.1 to 0.5mm.

Note:

Whenever replacing the reel disk, perform the height adjustment.

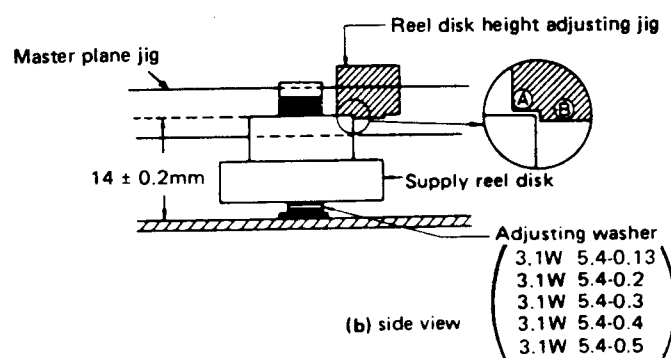
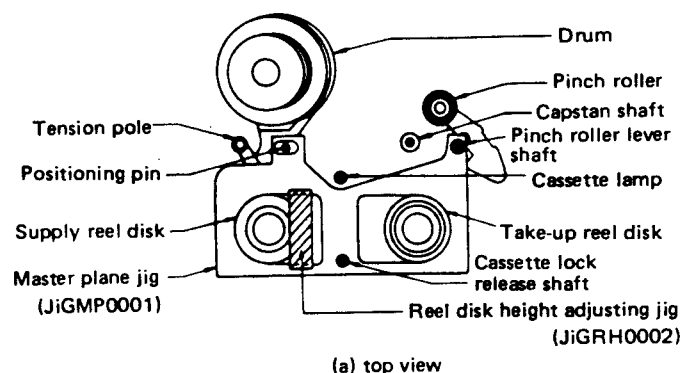


Figure 1-6.

CHECKING AND ADJUSTMENT OF TAKE-UP TORQUE IN FAST-FORWARD MODE

Notes:

1. When setting the torque gauge on the reel disk and pressing the fast-forward button to start the reel disk turning, take care that the torque gauge does not fly off.
2. The checking and adjustment should be carried out without a video cassette tape in place.

Checking

1. Remove the cassette housing.
2. Set the torque gauge on the take-up reel disk and press the fast-forward button to get the unit in the fast-forward mode.
3. Turn the torque gauge slowly (one rotation every 2 to 3 seconds) by hand in the take-up direction until it indicates 600g.cm or more.

Check that there is no slippage between the reel idler, and relay idler or take-up reel disk.

Adjustment

If the take-up torque is outside the specified value, clean the relay idler, reel idler and take-up reel disk with cleaning fluid, and recheck the torque.

If the take-up torque is still out of specification, replace the reel belt.

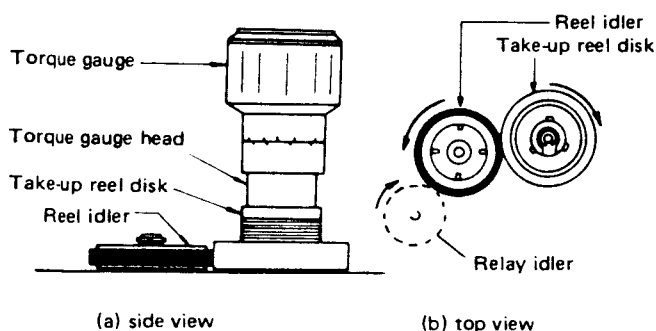


Figure 1-7.

CHECKING AND ADJUSTMENT OF TAKE-UP TORQUE IN REWIND MODE

Notes:

1. When setting the torque gauge on the reel disk and pressing the rewind button to start the reel disk turning, take care that the torque gauge does not fly off.
2. When checking the take-up torque, do not keep the reel disk in a lock condition for a longer time.

Checking

1. Remove the cassette housing.
2. Set the torque gauge on the supply reel disk and press the rewind button to get the unit in the rewind mode.
3. Turn the torque gauge slowly (one rotation every 2 to 3 seconds) by hand in the take-up direction until it indicates 600g.cm or more. Check that there is no slippage between the reel idler and relay idler or supply reel disk.

Adjustment

If the take-up torque is outside the specified value, clean the relay idler, reel idler and supply reel disk with cleaning fluid then recheck the torque. If the take-up torque is still out of specification, replace the reel belt.

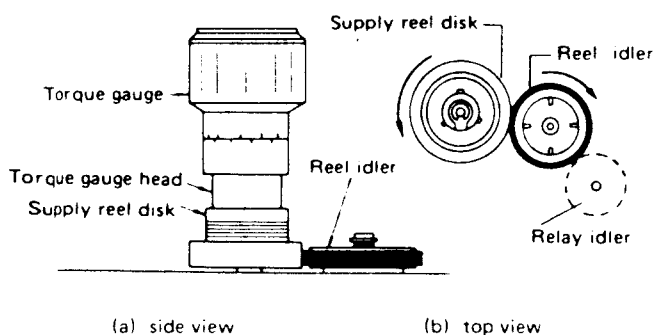


Figure 1-8.

CHECKING OF TAKE-UP TORQUE IN PLAY BACK MODE

Checking

Load a torque cassette meter (JiGVHT-063) into the unit and press the record button to get the unit in the record mode. (It is necessary to input the external signal). Then check that the torque is at the specified values;
standard torque: $110 \pm 40\text{g.cm}$

Note:

The measured torque varies slightly with the rotation deviation of the reel drive unit. The control value within the variation shall be the observed value.

Adjustment

1. If the take-up torque in playback mode is outside the specified value, clean the reel idler, take-up reel disk and relay idler with cleaning fluid, then recheck the torque.
2. Press the record button to get the unit in the record mode, and check that the take-up torque is within the specified value.
3. Even after step 1 above, if the take-up torque in playback mode is still out of specification, replace the reel drive unit.

CHECKING OF BACK TENSION IN FAST-FORWARD MODE

Note:

Set the torque gauge securely on the reel disk; otherwise the torque gauge will be loose above the reel disk causing an inaccurate measurement.

Checking

1. Remove the cassette housing.
2. Press the fast-forward button to get the unit in the fast-forward mode.
3. Set the torque gauge on the supply reel disk, turn it clockwise slowly (one rotation every 2 to 3 seconds) and check that the torque is within $37 \pm 5\text{g.cm}$.

CHECKING OF BACK TENSION IN REWIND MODE

Note:

Set the torque gauge securely on the reel disk; otherwise the torque gauge will be loose above the reel disk causing an inaccurate measurement.

Checking

1. Remove the cassette housing.
2. Press the rewind button to get the unit in the rewind mode.
3. Set the torque gauge on the take-up reel disk, turn it counterclockwise slowly (one rotation every 2 to 3 seconds) and check that the torque is within $25 \pm 5\text{g.cm}$.

CHECKING OF BACK TENSION IN VIDEO SEARCH REWIND MODE

Note:

Set the torque gauge securely on the reel disk; otherwise the torque gauge will be loose above the reel disk causing an inaccurate measurement.

Checking

1. Remove the cassette housing.
2. Press the play button to get the unit in the playback mode.
3. Press the video search rewind button to get the unit in the video search rewind mode.
4. Set the torque gauge on the take-up reel disk, slowly turn it counterclockwise (one rotation every 2 to 3 seconds) and check that the torque is within $40 \pm 8\text{g.cm}$.

CHECKING OF PINCH ROLLER ENGAGEMENT FORCE

Checking

1. Remove the cassette housing.
 2. Press the play button to get the unit in the playback mode.
 3. Using a tension gauge adapter, pull the pinch roller in the direction of arrow $\Rightarrow$ (A) (opposite to the pinch roller engagement) to that the pinch roller moves away from the capstan shaft.
 4. Gradually return the pinch roller in the direction of arrow $\Rightarrow$ (B) to allow it to touch the capstan shaft. When the pinch roller just touches the capstan shaft, read the indication on the gauge (JiGSG 2000).
- For the measurement, pull the tension gauge which is to be fixed on the capstan shaft by means of the tension gauge adapter (JiGADP003).
5. Check that the reading on the gauge is in the specified range of 1000 to 1200g.

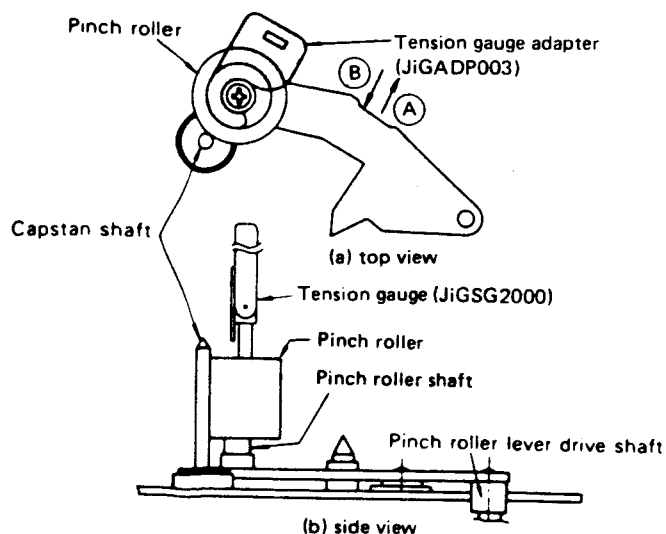


Figure 1-9.

CHECKING OF REEL IDLER PRESSURE

Checking

1. Remove the cassette housing.
2. Move the reel idler to its center position as shown in Fig. 1-10.
3. Using a tension gauge, press the reel idler in the direction of arrow $\Rightarrow$ (A) in Fig. 1-10, so that the reel idler moves away from the relay idler.
4. Release the force gradually in the direction of arrow $\Rightarrow$ (B) in Fig. 1-10, so that the reel idler touches the relay idler again. Check that the reading on the tension gauge is within the specified range of 105 to 145g.

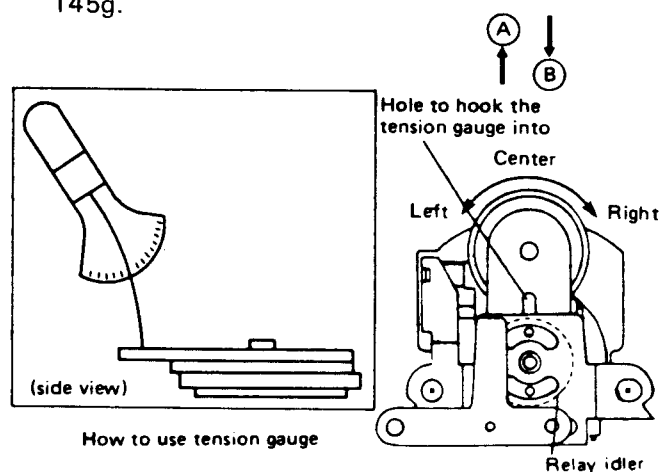


Figure 1-10.

CHECKING AND ADJUSTMENT OF TENSION POLE POSITION

Checking

1. Remove the cassette housing.
2. Load a video cassette tape and press the record button to get the unit in the record mode.
3. The pole bases A and B operate to draw the tape out of the cassette housing and simultaneously the tension pole moves to the left, loading the tape. Check the position of the tension pole after the tape loading has finished.
4. At the end of a tape (E-180), visually check that the tension pole's center is 0.6 to 1.0mm to the right of the supply impedance roller's center.
5. Check that the tape is neither curled against the flange of the supply impedance roller nor mounted over it.
6. During the video search rewind mode, check that the reel disk is free of the tension band.

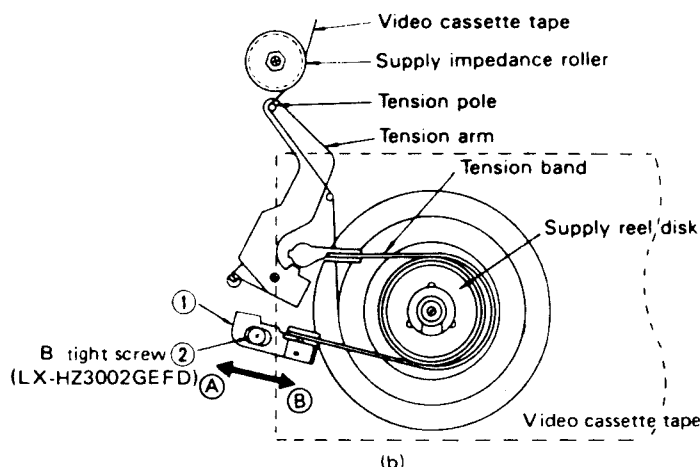
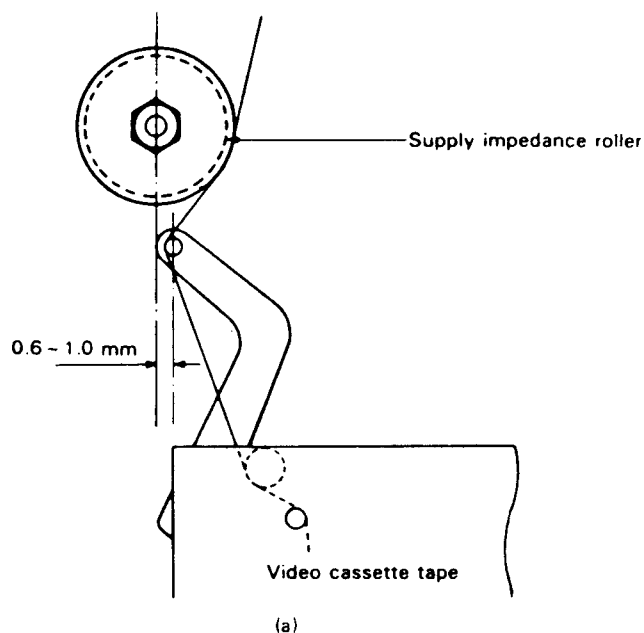


Figure 1-11.

Positioning adjustment

1. If the tension pole is less than 0.6mm to the right of the supply impedance roller's center, shift the tension band control angle ① in the direction of arrow ➡ A in Fig. 1-11(b), and tighten the screw ②.
2. If the tension pole is more than 1.0mm to the right of the supply impedance roller's center, shift the tension band control angle ① in the direction of arrow ➡ B in Fig. 1-11(b), and tighten the screw ②.

Note:

If the screw is tightened with more than the specified torque (5 kg), the screw hole will be crushed as it is made of resin.

To avoid this, be sure to use the supplied torque driver (JiGTD1200).

CHECKING AND ADJUSTMENT OF BACK TENSION IN RECORD AND PLAYBACK MODES

Checking of back tension using a torque cassette meter (JiGVHT-063)

1. Remove the cassette housing.
2. Load the torque cassette into the unit.
3. Press the record button to get the unit in the record mode.
4. Check that the reading of the torque cassette's pointer is within 50 to 58g.cm.
5. Check that the video tape is wound round the retaining guide.
6. Check that the tape is not slack or damaged at either of its beginning and end points.

Adjustment

1. If the reading is below 50g.cm, shift the tension adjusting lever ① in the direction of arrow ➡ A in Fig. 1-12, and tighten the screw ②.
2. If the reading is over 58g.cm, shift the tension adjusting lever ① in the direction of arrow ➡ B in Fig. 1-12, and tighten the screw ②.

Note:

Do not overtighten the screws as this may damage the screw threads on the chassis. To avoid this, properly handle the tension band and plate adjusting driver (JiGDRIVER-6).

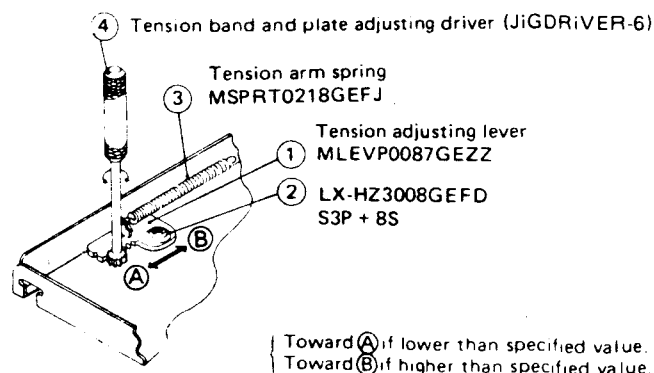


Figure 1-12.

CHECKING OF THE BRAKE TORQUE

Checking of the brake torque at supply side

1. Remove the cassette housing.
2. Check that the unit is in the stop mode.
3. Separate the reel idler from the supply reel disk, and set the torque gauge on the supply reel disk.
4. Slowly rotate the torque gauge in both directions so that both the reel disk and torque gauge's pointer will move at the same speed: see that the reading is then within 280 to 720g.cm (at the brake engaging direction) or within 110 to 230g.cm (at the brake disengaging direction). And check that the brake ratio is more than 2 between its engaging and disengaging directions.

Adjustment of the brake torque at supply side

1. If the brake torque at supply side is outside the specified value (280 to 720g.cm in the engaging direction or 110 to 230g.cm in the disengaging direction), clean the supply reel disk and brake lever felt with cleaning fluid, then recheck the torque.
2. If the brake torque at supply side is still out of specification, replace the main brake spring.

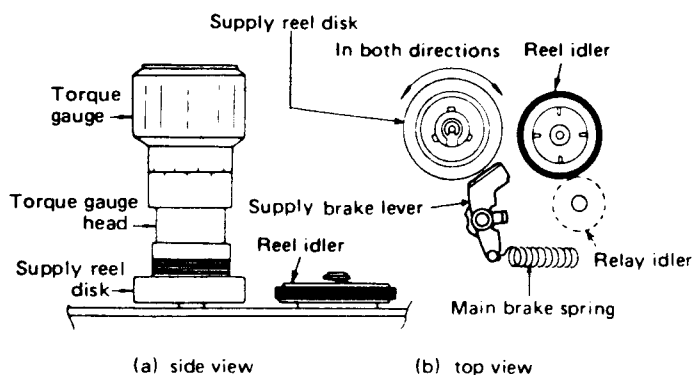


Figure 1-13.

Checking of the brake torque at take-up side

1. Remove the cassette housing.
2. Check that the unit is in the stop mode.
3. Separate the reel idler from the take-up reel disk, and set the torque gauge on the take-up reel disk.
4. Slowly rotate the torque gauge in both directions so that both the reel disk and torque gauge's pointer will move at the same speed: see that the reading is then within 280 to 720g.cm (at the brake engaging direction) or within 110 to 230g.cm (at the brake disengaging direction). And check that the brake ratio is more than 2 between its engaging and disengaging directions.

Adjustment of the brake torque at take-up side

1. If the brake torque at take-up side is outside the specified value (280 to 720g.cm in the engaging direction or 110 to 230g.cm in the disengaging direction), clean the take-up reel disk and brake lever felt with cleaning fluid, then recheck the torque.
2. If the torque at take-up side is still not within the specified value, replacement the main brake spring.

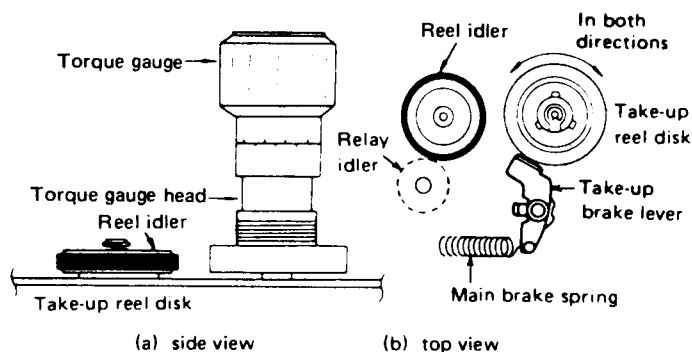


Figure 1-14.

TILT CHECKING AND ADJUSTMENT OF AUDIO/CONTROL HEAD

Adjustment

1. Put the unit in the unloading mode.
Set the audio/control head tilt adjusting jig on the main chassis as shown in Fig. 1-15. For details, also see Fig. 1-15. Using a philips screwdriver, slowly turn the adjusting screw until there is no clearance between the jig and audio/control head. (See Fig. 1-20)

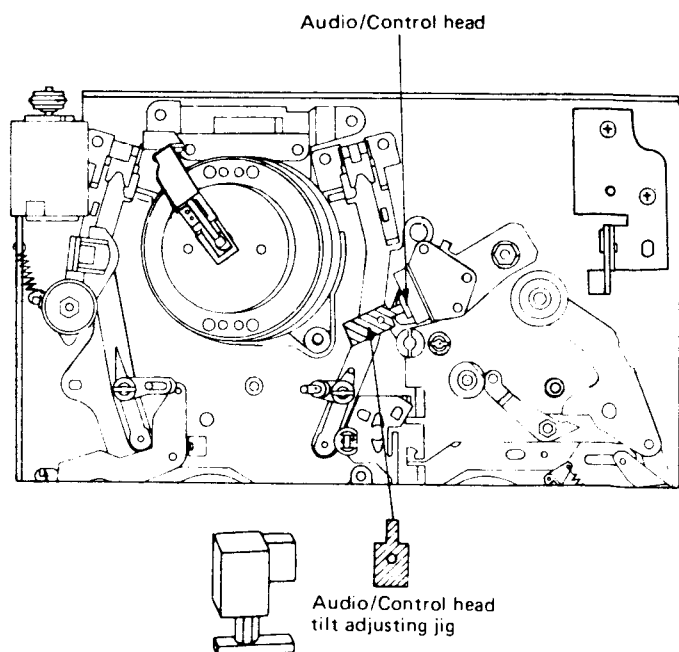


Figure 1-15.

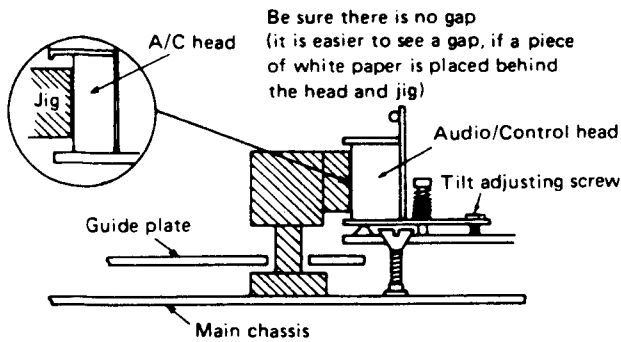


Figure 1-16.

REPLACEMENT OF AUDIO/CONTROL HEAD

Note:

After replacement, check for smooth tape movement. Under all circumstances avoid touching the head surface (indicated by "→" in Fig. 1-18).

Replacement

1. Remove the leads from the audio/control head PWB.
2. Undo the tilt adjusting screw ⑥ with a philips screwdriver.
3. Remove the screw ⑤ (3P+8S) with a philips screwdriver.
4. Undo the audio/control head screw ④ with a philips screwdriver: pay attention to the spring between the guide plate and the audio/control head screw.
5. Unsolder the connector attached to the audio/control head PWB, and resolder this connector to the new audio/control head PWB. Then replace the audio/control head assembly with a new one.
6. Install the new audio/control head assembly so that the audio/control head plate is almost in parallel with the guide plate.
7. Adjust the audio/control head tilt angle as shown in Fig. 1-16.
8. Use a rough alignment tape and play it back. Using the specified box driver, turn the hexagon nut for audio/control head height adjustment so that the audio/control head has the height with regard to the tape as shown in Fig. 1-17.

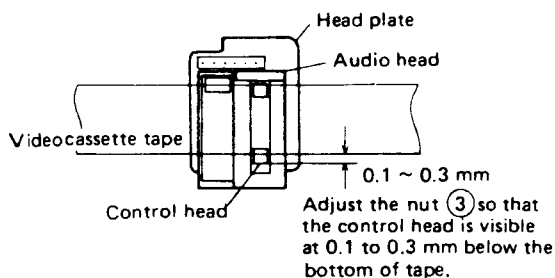


Figure 1-17.

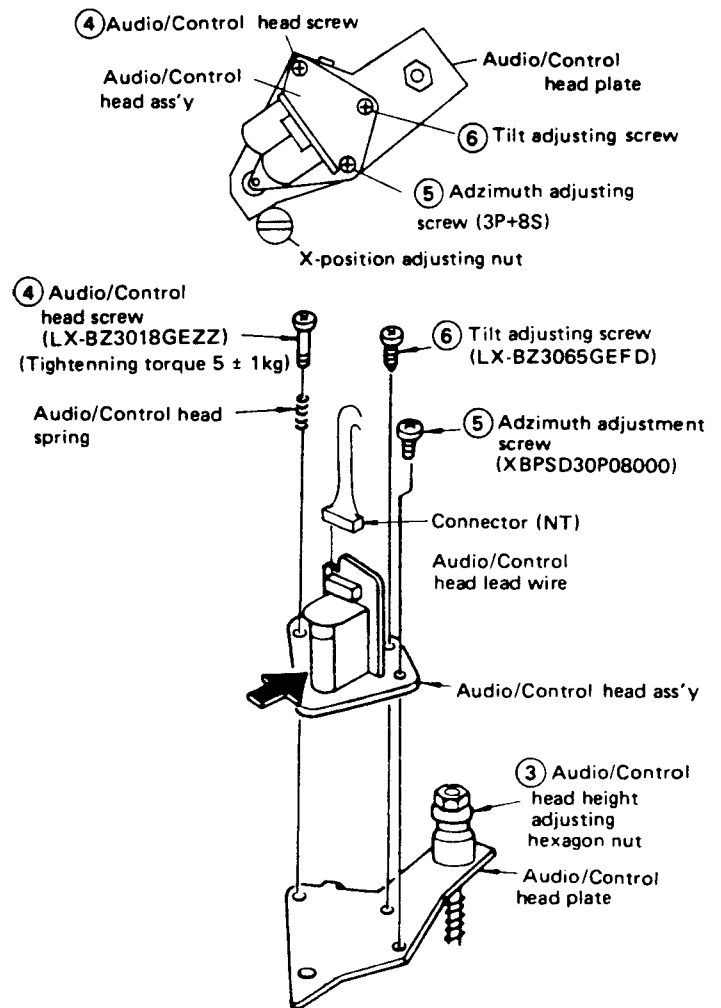


Figure 1-18.

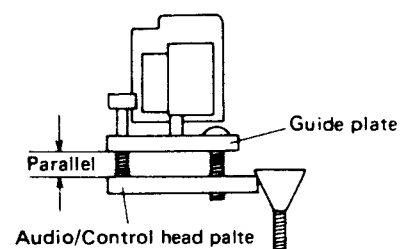


Figure 1-19.

ADJUSTMENT OF TAPE TRAVEL

1. Check and adjust the position of the tension pole.
And check and adjust back tension (See page 20).
2. Set the tilt angle of the audio/control head as shown in Fig. 1-16.

Note:

If the audio/control head is adjusted, check and set the tilt angle as in the case of replacement.

3. After completing setting, execute preliminary adjustment of tape travel.
 - a. Connect an oscilloscope to TP301 (playback chrominance) and TP303 (ground). Allow the playback chrominance signal to be triggered by the head switching pulse of TP302.
 - b. Loosen the setscrew of the guide roller, and tighten it loosely by using a guide roller adjusting screwdriver (JiGDRIVERH-4) to such an extent so that the guide roller turns smoothly.
 - c. Set an alignment tape (VRōCPSV) on the reel disk.

Note:

When setting the cassette tape on the reel disk without cassette housing, fix the cassette tape with weight of 400 to 650g.

- d. Set playback mode.
- e. Observe the playback chrominance envelope waveform and check flatness of the playback chrominance envelope, turning the tracking control clockwise and counterclockwise. If playback chrominance output changes almost flat when the tracking control is turned clockwise and counterclockwise, it is good. If the flatness is poor, adjust the guide roller so that playback chrominance output becomes nearly flat. Adjust the X-position adjusting nut so that the playback chrominance envelope becomes almost maximum in the tracking center. In the case of rough adjustment, pay particular attention to the outlet side (See Fig. 1-21).

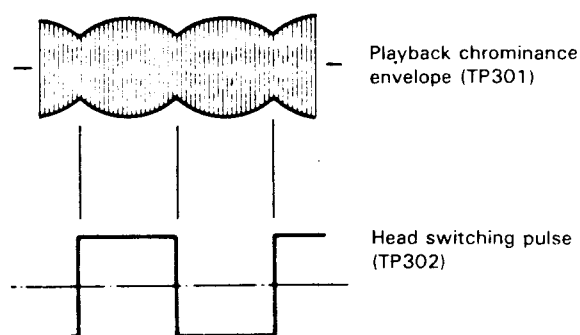


Figure 1-21.

4. When rough adjustment of the tape travel is finished, adjust the audio/control head's height and azimuth.
 - a. Play an alignment of the tape, audio 6 kHz (picture is monoscope), and observe the audio output on an oscilloscope from the audio output terminal.
 - b. Adjust the azimuth adjusting screw (5) (3P + 8S) to obtain the maximum audio output level.
 - c. Slowly rotate the audio/control head's height adjusting hexagon nut (3) by the specified box driver (JiGDRIVER110-7) to obtain the maximum audio output level.
5. After the audio/control head adjustment, proceed to final tape travel adjustment and X-position adjustment.
 - a. Connect as stated in 3-a.
 - b. Play an alignment tape (VRōCPSV).
 - c. Observing the envelope on the oscilloscope, finely adjust the guide roller height.

Rotate the tracking control clockwise and counterclockwise to adjust the guide roller so as to attain the best flatness of envelope. If the video tape deviates up or down the helical lead, the playback chrominance envelope waveform is as shown in Fig. 1-22. Attain the best flatness of envelope, following the procedure shown in Fig. 1-22.

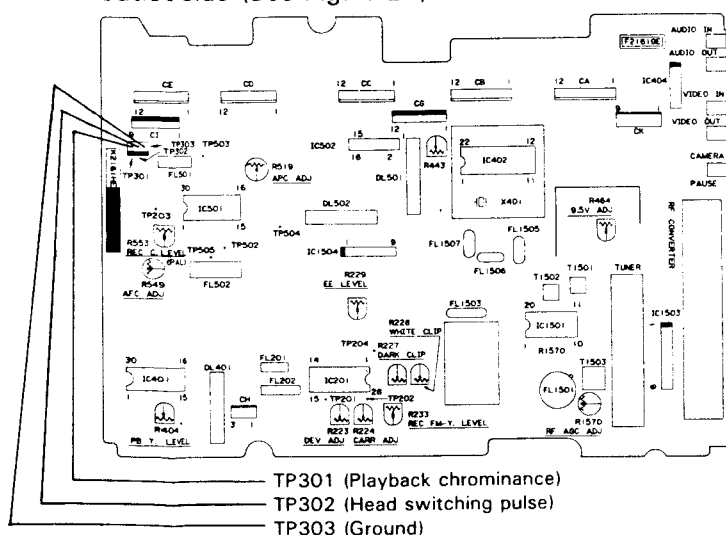


Figure 1-21.

	When the tape is loose above the helical lead position.		When the tape is close to the helical lead position.	
	Drum inlet	Drum outlet	Drum inlet	Drum outlet
When the tracking control is turned clockwise				
When the tracking control is turned counterclockwise				
Adjustment procedures	Lower the guide roller (at the drum inlet) by turning it clockwise to make flat the envelope.	Lower the guide roller (at the drum outlet) by turning it clockwise to make flat the envelope.	First raise the guide roller (at the drum inlet) by turning it counterclockwise to have the tape float above the helical lead position, then turn the guide roller clockwise to make flat the envelope.	First raise the guide roller (at the drum outlet) by turning it counterclockwise to have the tape float above the helical lead position, then turn the guide roller clockwise to make flat the envelope.

Figure 1-22.

Notes:

The above adjustment is made at the switching pulse high channel side (See Fig. 1-21).

The broken lines represent the envelope waveform when up-down deviation is maximum.

After adjustment, finally tighten the setscrew of the guide roller.

Again play an alignment tape (VR̄CPSV) (in unloading mode), and check that the envelope of playback chrominance envelope signal is normal.

- d. After tape travel adjustment, adjust the X-position. Set the playback mode tracking control to the preset position, rotate the X-position adjusting nut shown in Fig. 1-23 with the X-position adjusting screwdriver so as to obtain the maximum envelope of switching pulse (Low channel), and adjust the positions of the audio/control head. After the X-position adjustment, adjust the switching point to $6.5 \pm 0.5H$. Check the flatness of envelope and sound by self-recording.

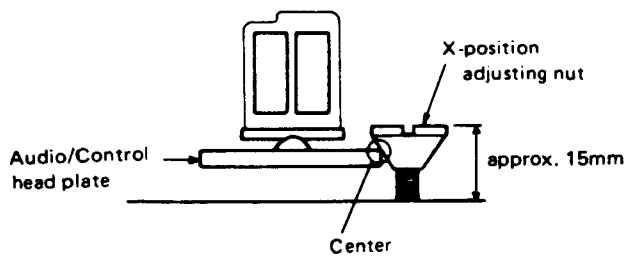


Figure 1-23.

REPLACEMENT OF UPPER DRUM

Note:

The engagement between the disk (outer diameter) and the upper drum (inner diameter) is very accurate in the order of microns, and due care should be paid to their replacement. Even a slight entry of foreign matter will affect the accuracy of their reassembly.

Replacement

1. Unsolder the leads ① to ⑧ and remove them.
2. Remove two screws ⑨ [brass screws (W3P + 9S) with plain washer] by using a philips screwdriver.
3. Withdraw the upper drum with care not to allow it to be tilted, and replace it. Do not damage the outer surface of the disk. For withdrawal of the upper drum, use the jig (specialized for removing the upper drum) shown in Fig. 1-24.

Notes:

1. Avoid touching the drum surface with bare hands.
2. Do not hit on the screws, when driving them in.

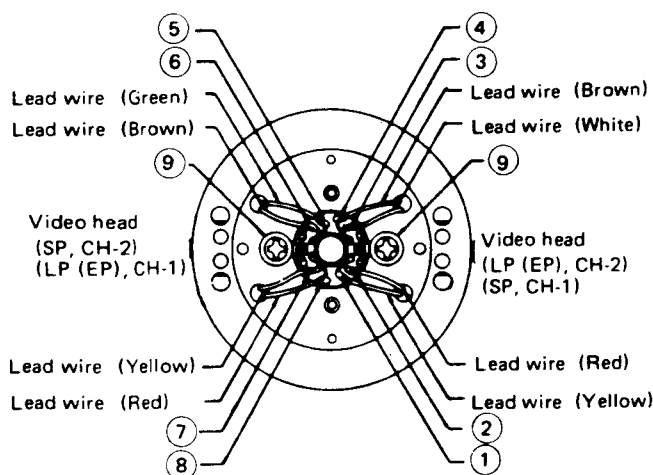


Figure 1-24.

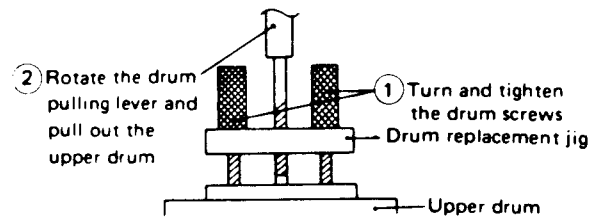


Figure 1-25.

Reassembly

1. Set in place the new upper drum as shown in Fig. 1-28, and arrange the leads to be at their specified positions.

Notes:

1. Before replacement the upper drum, check that there are no scratches or dust on the edge or the outer surface of the disk.
2. Before replacing, the upper drum, check that there are no scratches or dust on the edge or the inner surface of the upper drum.
3. On assembling these parts, slowly insert the upper drum into the disk with the utmost care, so that the upper drum will not be tilted.
4. When assembling these parts, do not allow foreign matter to come between them.
5. Do not use excessive force when driving in the screws.

2. Fasten the upper drum with two screws ⑨.
3. Solder the leads ① to ⑧ at their respective positions.

Note:

Soldering should be performed quickly and carefully without touching the adjoining patterns.

4. After the replacement, be sure to check the tape travel and the followings.
 - a. Adjustment of the playback switching point.
 - b. Adjustment of the playback amplifier.
 - c. Checking and adjustment of the X-position.
 - d. Checking and adjustment of the tape travel at SP mode.

REPLACEMENT OF THE MECHANISM CONTROL UNIT

Removal

1. Remove the cam switch leads (red, black and blue) from the reel sensor PWB.
2. Remove the E-ring.
3. Remove three B-tight screws.
4. Holding up the mechanism control unit angle, detach it from the main chassis.

Reassembly

1. Remove the slit washer and relay gear B.
2. Align the shifter A and brake drive lever with each other.
(There is an alignment hole on the main chassis, and each of the shifter A and brake drive lever is also given an alignment hole. Use these holes for alignment of the parts; to facilitate this, remove the main brake spring.)
3. Remove the tension arm spring, and rotate the loading gear A and loading gear B fully in the arrow direction to get the unit in the unloading mode.
4. Remove the full erase head arm spring and move the arm in the indirection of arrow ➡ (A).
5. Rotate the brake cam of the mechanism control unit angle in the arrow direction, and bring the center of the alignment hole of the segment gear to that of the alignment hole of the supporting angle.
6. Attach the mechanism control unit angle to the main chassis: to facilitate this, move the shifter A rightward.
7. Secure the three B-tight screws.
8. Fit the E-ring.
9. Arrange the cam switch leads (red, black and blue) on the reel sensor PWB.
10. Fit the relay gear B and slit washer.
11. Replace the main brake spring and other springs to their original positions.

Notes:

1. When tightening the B-tight screw (LX-HZ3027GEFD), do not give it undue force with more than the specified torque. Or the screw threads of the boss may be crushed.
2. After the reassembly, check for proper alignment of each part and see that the mechanism is normally functioning in each mode.

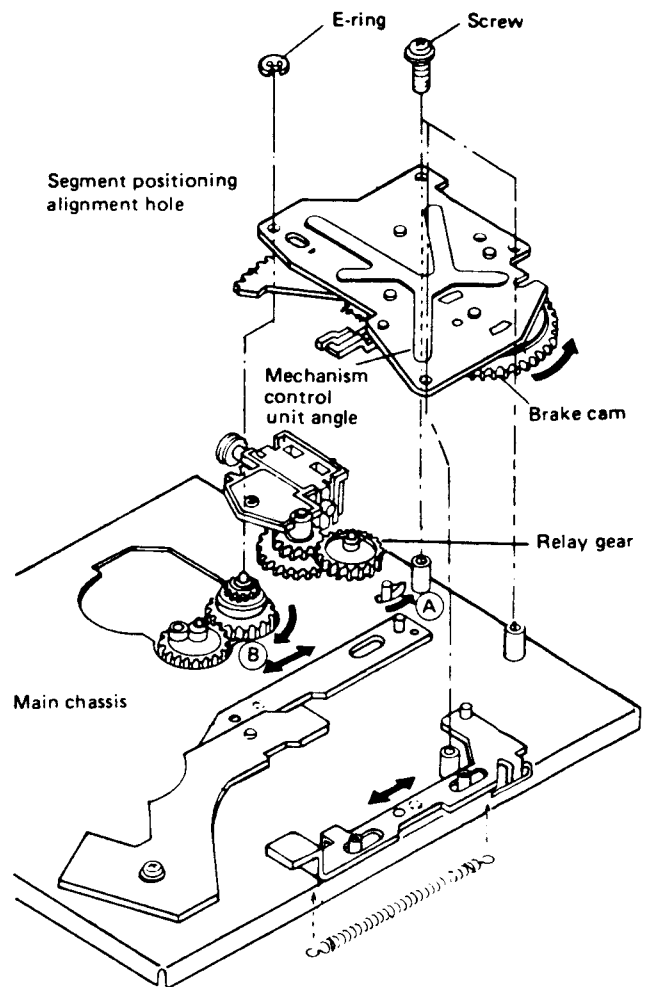


Figure 1-26.

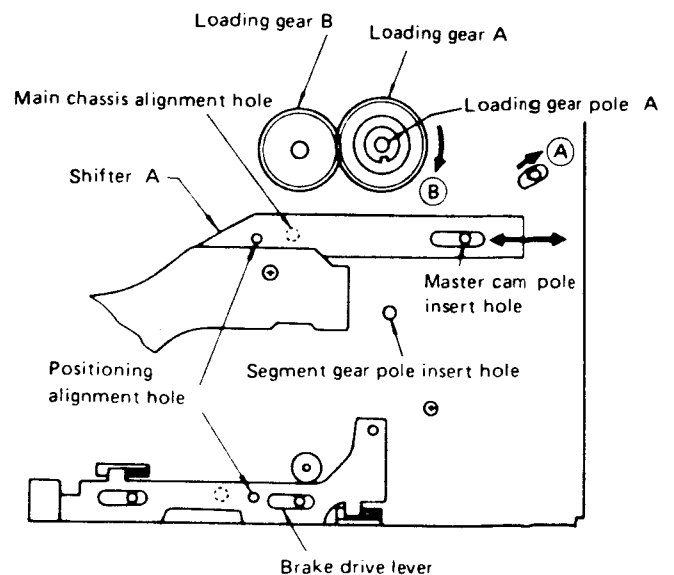


Figure 1-27.

REPLACEMENT OF CAM SWITCH

Removal

1. Remove the slit washer from the mechanism control unit angle and detach the brake cam.
2. Remove the cam switch from the mechanism control unit angle.

Note:

Keeping the clip of the cam switch in the arrow direction, remove the cam switch from the mechanism control unit angle.

Reassembly

1. Attach the cam switch to the brake cam.
2. Set the brake cam and cam switch assemblies on the mechanism control unit angle.

Note:

At the time, align the positioning mark **A** of the master cam and the positioning mark **B** of the brake cam with each other, and allow the torque change lever to come into the groove of the brake cam.

3. Attach the slit washer to the pole of brake cam.

Notes:

1. After the reassembly, rotate the brake cam in either direction to see that the torque change lever is in the groove of the brake cam.
2. When replacing the master cam and/or brake cam, never fail to apply grease to its groove.

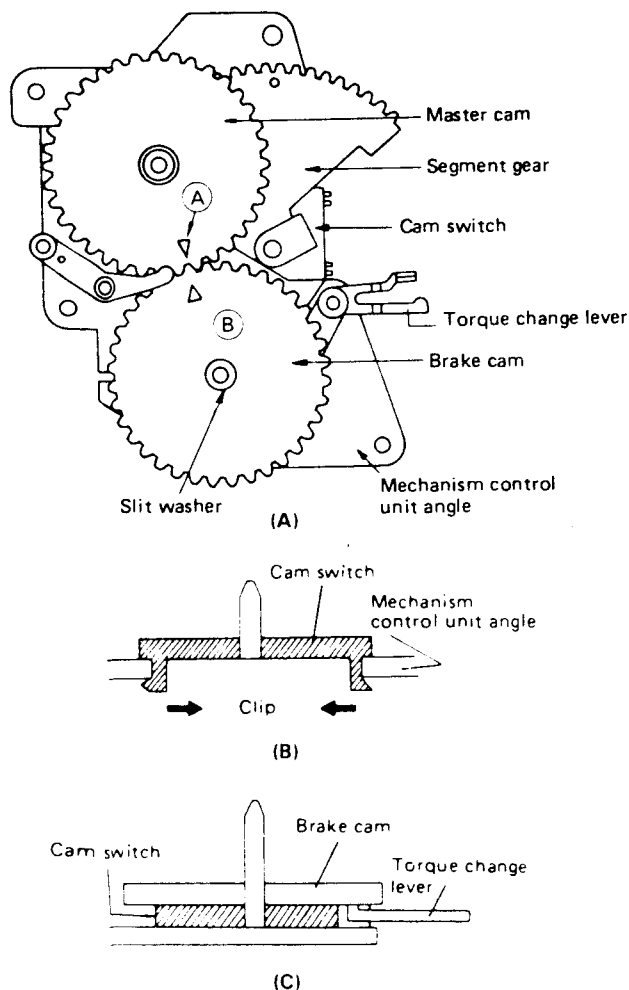


Figure 1-28.

REPLACEMENT OF CAPSTAN DD (Direct Drive) MOTOR

Removal

1. Remove the lead wire connector from the capstan DD (direct drive) motor control PWB. When removing the cable from the PWB, hold the PWB with your hand so that it won't be damaged with the shock resulting from the removal.
2. Remove the B-tight screw which secure the capstan DD motor control PWB with the main chassis.
3. Remove the cup tight screw which secure the capstan DD motor heat sink plate with the main chassis.
4. Remove three screws 2.6P + 5.5S (S. Cup)(LX-HZ3036GEFD) and detach the capstan DD motor from the main chassis.

Reassembly

1. Position the capstan DD motor on the main chassis with care not to allow the capstan shaft to hit the main chassis. Then secure the capstan DD motor and main chassis with the three screws 2.6P + 5.5S(S.Cup)(LX-HZ3036GEFD).
2. Set the capstan DD motor control PWB on the main chassis, and secure them with the B-tight screw.
3. Set the capstan DD motor heat sink plate on the main chassis, and secure them with the cup tight screw.
4. Connect the lead wire connector to the capstan DD motor control PWB.

Notes:

1. After installing the new capstan DD motor, be sure to let it run.
2. Check and adjust the servo circuit.
3. When tightening the B-tight screw, do not give it undue force with more than the specified torque. Or the screw threads of the boss may be crushed.

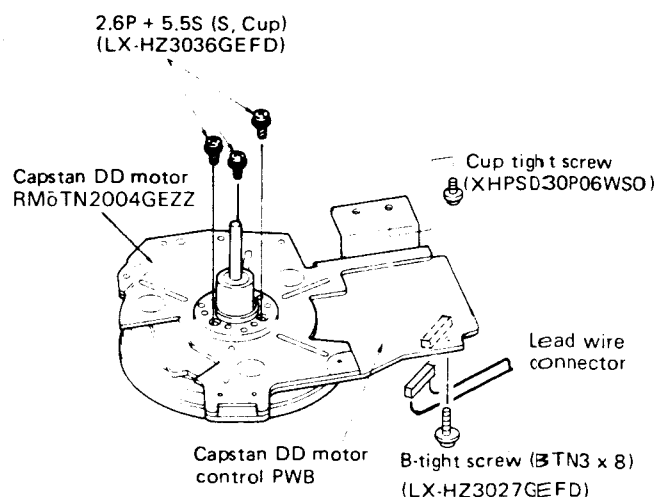


Figure 1-29.

CHECKING OF THE UNIVERSAL BRAKE LEVER

Checking

1. Remove the cassette housing.
2. Press the play button to set the unit to playback mode, and remove the power cord.
3. Remove the reel idler from the take-up reel disk, and set the torque gauge.
4. Slowly rotate the torque gauge so that the reel disk and torque gauge pointer turn with the equal speed, and check that the set value is as specified (within $30 \pm 10 \text{ g.cm}$).

REPLACEMENT OF THE LOADING MOTOR

Replacement

1. Remove four screws (XEBSD40P16000) securing the main chassis to the bottom cabinet.
2. Disconnect the drum DD motor lead connector and the loading motor relay lead NF connector.
3. Remove the loading belt.
4. Remove the cup-tight screw (XHPSD30P08WSO) (6). Tilt the main chassis for easy removal.
5. Remove two screws (XBPSD30P05J00) (2) and remove the loading motor from the loading motor holder.
6. Remove the loading motor PWB (5).
7. Replace the loading motor along with the pulley.

Notes:

1. Check that the space between the motor and the loading motor pulley is $4.5 \pm 0.1 \text{ mm}$.
2. After installing the loading motor, be sure to rotate the loading motor, check for smooth movement and recheck the height checking and adjustment of reel disks and also the adjustment of tape travel (see page 23).

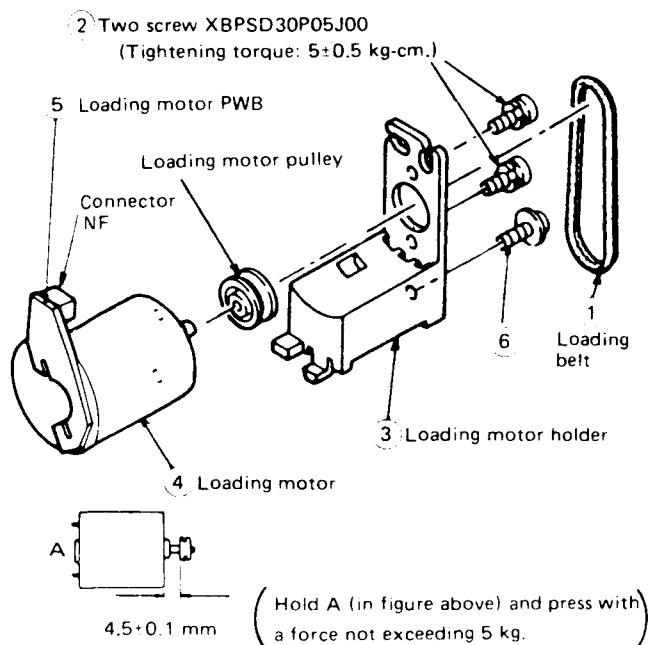


Figure 1-30.

REPLACEMENT OF DD (Direct Drive) MOTOR

Removal

1. Remove two screws (1), using a philips screwdriver, which hold the DD rotor assembly.
2. Remove the DD rotor assembly by pulling it straight out.
3. Remove three brass screws (2), using a philips screwdriver, which hold the DD stator assembly.
4. Remove the DD stator assembly by pulling it straight out.

Assembly

1. Place the DD stator assembly on top of the lower drum.
2. Secure the DD stator with the three brass screws (2) by using a philips screwdriver.

Note:

Be careful not to scratch the core, winding or hall element.

3. Install the DD rotor assembly onto the drum shaft.

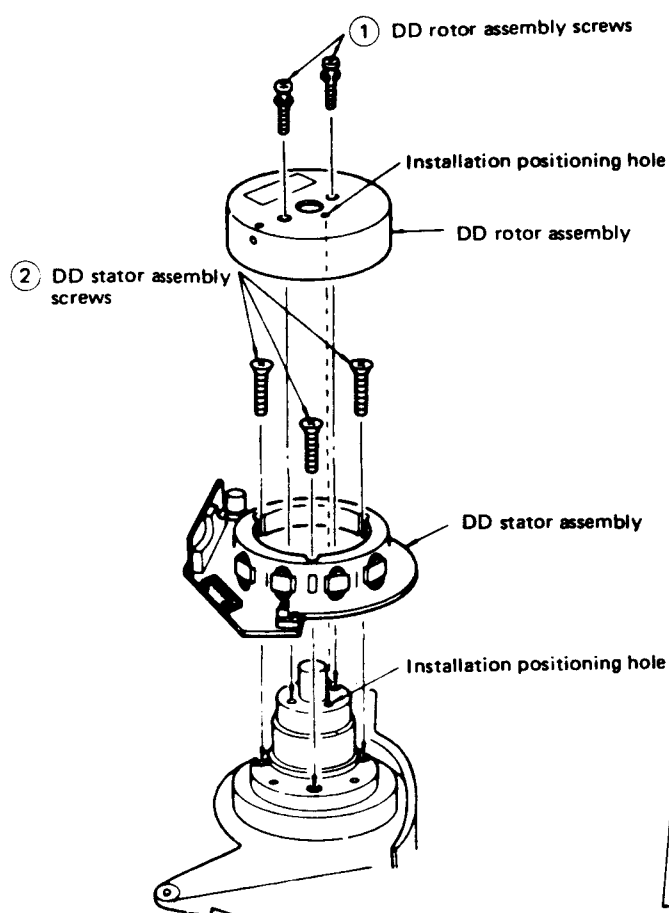
Note:

Press it down straightly and observe it's setting direction as shown in Fig. 1-31.

4. Secure the DD rotor assembly by the screw (1).
5. Apply screw-lock to the screws (1).
6. After the replacement of DD motor adjust the playback switching point.

Notes:

1. Be careful not to damage the upper drum or the video head.
2. Do not let tools on the DD rotor assembly contact or hit the hall element.



Note 1: Secure the DD rotor assembly so that the installation positioning holes in the DD rotor assembly and lower drum match.

Figure 1-31.

ADJUSTMENT OF PLAYBACK SWITCHING POINT

Caution:

This mode is applicable to PAL system, and it is needed to prepare alignment tape, PAL (VR6CPSV), for adjustment of the playback switching point.

Adjustment

Use an alignment tape (monoscope) to play it back, then adjust R716 (drum phase generator) so that the output is $6.5 \pm 0.5H$.

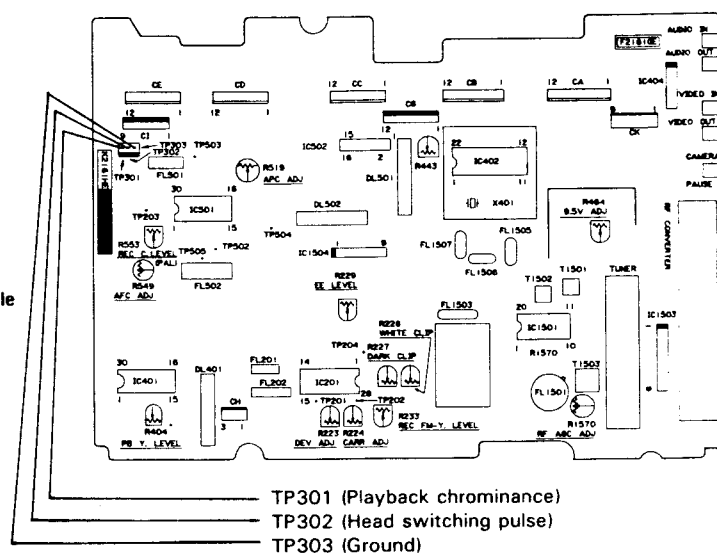


Figure 1-32.

If the equipment fails electrically, locate a defect or defects first of all using instruments. Then repair or replace parts and make adjustment by the procedures described below.

When required instruments are not available, do not move controls indiscriminately.

- Colour monitor TV
- DC regulated power supply
- VTVM
- Oscilloscope
- Audio generator
- Colour bar generator
- Alignment tape
- Frequency counter
- Blank video tape (VHS)

- **Test Points Layout of System Control, Servo, IF Tuner PWB.**

The block diagram illustrates the internal components and interconnections of the IC7000 receiver. Key components include:

- ICs:** IC7001, IC702, IC703, IC704, IC705, IC801, IC7002, IC7003, IC7004, IC7005, IC7006, IC7007, IC7008, IC7009, IC7010, IC7011, IC7012, IC7013, IC7014, IC7015, IC7016, IC7017, IC7018, IC7019, IC7020.
- Resistors:** R701, R702, R703, R704, R705, R706, R707, R708, R709, R710, R711, R712, R713, R714, R715, R716, R717, R718, R719, R720, R721, R722, R723, R724, R725, R726, R727, R728, R729, R730, R731, R732, R733, R734, R735, R736, R737, R738, R739, R740, R741, R742, R743, R744, R745, R746, R747, R748, R749, R750, R751, R752, R753, R754, R755, R756, R757, R758, R759, R760, R761, R762, R763, R764, R765, R766, R767, R768, R769, R770, R771, R772, R773, R774, R775, R776, R777, R778, R779, R780, R781, R782, R783, R784, R785, R786, R787, R788, R789, R790, R791, R792, R793, R794, R795, R796, R797, R798, R799, R800, R801, R802, R803, R804, R805, R806, R807, R808, R809, R810, R811, R812, R813, R814, R815, R816, R817, R818, R819, R820, R821, R822, R823, R824, R825, R826, R827, R828, R829, R830, R831, R832, R833, R834, R835, R836, R837, R838, R839, R840, R841, R842, R843, R844, R845, R846, R847, R848, R849, R850, R851, R852, R853, R854, R855, R856, R857, R858, R859, R860, R861, R862, R863, R864, R865, R866, R867, R868, R869, R870, R871, R872, R873, R874, R875, R876, R877, R878, R879, R880, R881, R882, R883, R884, R885, R886, R887, R888, R889, R890, R891, R892, R893, R894, R895, R896, R897, R898, R899, R900, R901, R902, R903, R904, R905, R906, R907, R908, R909, R910, R911, R912, R913, R914, R915, R916, R917, R918, R919, R920, R921, R922, R923, R924, R925, R926, R927, R928, R929, R930, R931, R932, R933, R934, R935, R936, R937, R938, R939, R940, R941, R942, R943, R944, R945, R946, R947, R948, R949, R950, R951, R952, R953, R954, R955, R956, R957, R958, R959, R960, R961, R962, R963, R964, R965, R966, R967, R968, R969, R970, R971, R972, R973, R974, R975, R976, R977, R978, R979, R980, R981, R982, R983, R984, R985, R986, R987, R988, R989, R990, R991, R992, R993, R994, R995, R996, R997, R998, R999, R1000, R1001, R1002, R1003, R1004, R1005, R1006, R1007, R1008, R1009, R1010, R1011, R1012, R1013, R1014, R1015, R1016, R1017, R1018, R1019, R1020, R1021, R1022, R1023, R1024, R1025, R1026, R1027, R1028, R1029, R1030, R1031, R1032, R1033, R1034, R1035, R1036, R1037, R1038, R1039, R1040, R1041, R1042, R1043, R1044, R1045, R1046, R1047, R1048, R1049, R1050, R1051, R1052, R1053, R1054, R1055, R1056, R1057, R1058, R1059, R1060, R1061, R1062, R1063, R1064, R1065, R1066, R1067, R1068, R1069, R1070, R1071, R1072, R1073, R1074, R1075, R1076, R1077, R1078, R1079, R1080, R1081, R1082, R1083, R1084, R1085, R1086, R1087, R1088, R1089, R1090, R1091, R1092, R1093, R1094, R1095, R1096, R1097, R1098, R1099, R1100, R1101, R1102, R1103, R1104, R1105, R1106, R1107, R1108, R1109, R1110, R1111, R1112, R1113, R1114, R1115, R1116, R1117, R1118, R1119, R1120, R1121, R1122, R1123, R1124, R1125, R1126, R1127, R1128, R1129, R1130, R1131, R1132, R1133, R1134, R1135, R1136, R1137, R1138, R1139, R1140, R1141, R1142, R1143, R1144, R1145, R1146, R1147, R1148, R1149, R1150, R1151, R1152, R1153, R1154, R1155, R1156, R1157, R1158, R1159, R1160, R1161, R1162, R1163, R1164, R1165, R1166, R1167, R1168, R1169, R1170, R1171, R1172, R1173, R1174, R1175, R1176, R1177, R1178, R1179, R1180, R1181, R1182, R1183, R1184, R1185, R1186, R1187, R1188, R1189, R1190, R1191, R1192, R1193, R1194, R1195, R1196, R1197, R1198, R1199, R1200, R1201, R1202, R1203, R1204, R1205, R1206, R1207, R1208, R1209, R1210, R1211, R1212, R1213, R1214, R1215, R1216, R1217, R1218, R1219, R1220, R1221, R1222, R1223, R1224, R1225, R1226, R1227, R1228, R1229, R1230, R1231, R1232, R1233, R1234, R1235, R1236, R1237, R1238, R1239, R1240, R1241, R1242, R1243, R1244, R1245, R1246, R1247, R1248, R1249, R1250, R1251, R1252, R1253, R1254, R1255, R1256, R1257, R1258, R1259, R1260, R1261, R1262, R1263, R1264, R1265, R1266, R1267, R1268, R1269, R1270, R1271, R1272, R1273, R1274, R1275, R1276, R1277, R1278, R1279, R1280, R1281, R1282, R1283, R1284, R1285, R1286, R1287, R1288, R1289, R1290, R1291, R1292, R1293, R1294, R1295, R1296, R1297, R1298, R1299, R1300, R1301, R1302, R1303, R1304, R1305, R1306, R1307, R1308, R1309, R1310, R1311, R1312, R1313, R1314, R1315, R1316, R1317, R1318, R1319, R1320, R1321, R1322, R1323, R1324, R1325, R1326, R1327, R1328, R1329, R1330, R1331, R1332, R1333, R1334, R1335, R1336, R1337, R1338, R1339, R1340, R1341, R1342, R1343, R1344, R1345, R1346, R1347, R1348, R1349, R1350, R1351, R1352, R1353, R1354, R1355, R1356, R1357, R1358, R1359, R1360, R1361, R1362, R1363, R1364, R1365, R1366, R1367, R1368, R1369, R1370, R1371, R1372, R1373, R1374, R1375, R1376, R1377, R1378, R1379, R1380, R1381, R1382, R1383, R1384, R1385, R1386, R1387, R1388, R1389, R1390, R1391, R1392, R1393, R1394, R1395, R

■ ADJUSTMENT OF SERVO TRICK CIRCUIT

Cautions

This adjustment consists of STEP 1 to STEP 14 and should be done, in principle, step by step thoroughly from the beginning to the end. If you, however, want to start the adjustment from the step on the way, observe the following points.

- For performing STEP 1 "Adjustment of PC 5.1V", be sure to check beforehand that both adjustments of Y/C circuit and 9.5V have been properly made.
- STEP 2 "Adjustment of X-position shift time" should be performed prior to taking the procedures for the X-position adjustment during tape travel alignment.
- In STEP 1 "Adjustment of PC 5.1V", if the checking voltage is largely apart from the specified value ($5.1 \pm 0.1V$), that is, if the difference between both values is 0.3V or more, it is needed to take all the procedures from STEP 1 to STEP 14.
- For the CH-1 and CH-2 phase adjustments from STEP 5 to STEP 8, the adjustment should be performed first for PAL system and then for NTSC system.
- For the adjustments of the false vertical sync from STEP 11 to STEP 13, be sure to check beforehand that the CH-1 and CH-2 phase adjustments (from STEP 5 to STEP 8) have been properly made.

STEP 1.

Adjustment of PC 5.1V.

1. Put the unit in the PAL playback mode.
2. Connect a VTVM to TP705 and TP704, and adjust R7707 (PC 5V control) so that the VTVM reads $5.1 \pm 0.1V$.

Note:

For the X-position adjustment, be sure to check beforehand that the adjustments of Y/C circuit and 9.5V, PC 5.1V adjustment of servo circuit (STEP 1) and X-position shift time adjustment (STEP 2) have been all properly made.

STEP 2.

Adjustment of X-position shift time

1. Put the unit in the PAL SP record mode (receiving any PAL broadcast signal).
2. Observe the output of TP701 (head switching pulse) and the output of TP707 (record control) with an oscilloscope.
3. Adjust R7004 so that it takes the specified time ($30.2 \pm 1\text{msec}$) from the rising edge of TP701 output (head switching pulse) to the rising edge of TP707 output (record control).

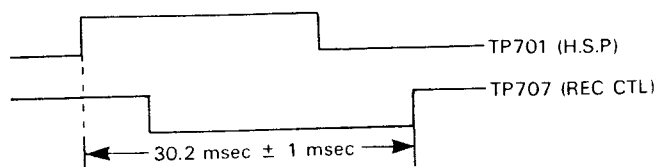


Figure 2-2.

4. Put the unit in the PAL LP record mode.
5. As with the unit in the PAL SP record mode, adjust R7002 so that it takes the specified time ($18.4 \pm 1\text{msec}$) from the rising edge TP701 output (head switching pulse) to the rising edge of TP707 output (record control).

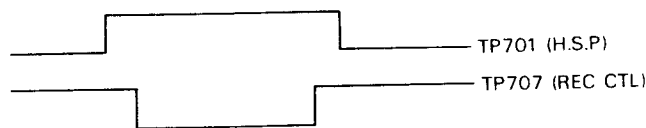


Figure 2-3.

STEP 3.

Adjustment of PAL tracking preset

1. Put the unit in the PAL playback mode, using an alignment tape (VRōCPSV).
2. Observe the output of TP702 (tracking) with an oscilloscope.
3. Adjust R756 (tracking preset control) so that the square-wave output is at the specified level ($20.0 \pm 1.0\text{msec}$) from the rising edge to the falling edge.

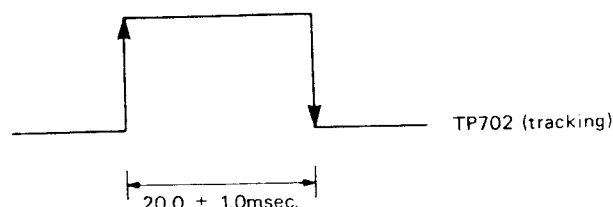


Figure 2-4.

STEP 4.

Checking of NTSC tracking preset

1. Put the unit in the NTSC playback mode, using an alignment tape (VRōATSV).
2. Observe the output of TP702 (tracking) with an oscilloscope.
3. Check that the square-wave output is at the specified level ($16.7 \pm 1.0\text{msec}$) from the rising edge to the falling edge.

Note:

If the specified level is not here obtained, readjust the PAL tracking preset in STEP 3 above and recheck the value in this step.

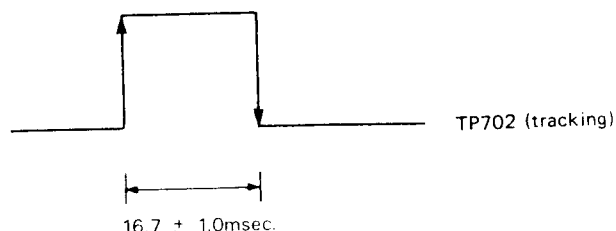


Figure 2-5.

STEP 5.**Adjustment of PAL CH-1 and CH-2 phase (SP mode)**

1. Put the unit in the PAL playback mode, using an alignment tape (VR0CPSV).
2. Observe the output of TP701 (head switching pulse) and video output with an oscilloscope.
3. Using the plus sync slope of oscilloscope, adjust R750 (3H SP CH-1 phase control) so that the output level is at $6.5 \pm 0.5H$.
4. Using the minus sync slope of oscilloscope, adjust R752 (3H SP CH-2 phase control) so that the output level is at $6.5 \pm 0.5H$.

STEP 6.**Adjustment of PAL CH-1/CH-2 phase relative error**

1. Put the unit in the PAL playback mode, using an alignment tape (VR0CPSV).
2. Observe the output of TP701 (head switching pulse) and video output with an oscilloscope.
3. Exchange the plus sync slope and minus sync slope of oscilloscope with each other, and check that the variation at the front of the vertical sync signal is within $\pm 0.5H$.
4. If the variation of CH-1 and/or CH-2 is not out of the specified range ($\pm 0.5H$), readjust the phase of CH-1 or CH-2 whichever has the larger variation.

Note:

If the CH-1/CH-2 phase relative error is greatly out of the specified range ($\pm 0.5H$), there is a trouble that the reproduced picture fluctuates vertically in the video search mode.

STEP 7.**Adjustment of NTSC CH-1 and CH-2 phase (SP mode)**

1. Put the unit in the NTSC playback mode, using an alignment tape (VR0ATSV).
2. Observe the output of TP701 (head switching pulse) and video output with an oscilloscope.
3. Using the plus sync slope of oscilloscope, adjust R748 (2H SP CH-1 phase control) so that the output level is at $6.5 \pm 0.5H$.
4. Using the minus sync slope of oscilloscope, adjust R754 (2H SP CH-2 phase control) so that the output level is at $6.5 \pm 0.5H$.

STEP 8.**Adjustment of NTSC CH-1/CH-2 phase relative error**

1. Put the unit in the NTSC playback mode, using an alignment tape (VR0ATSV).
2. Observe the output of TP701 (head switching pulse) and video output with an oscilloscope.
3. Exchange the plus sync slope and minus sync slope of oscilloscope with each other, and check that the variation at the front of the vertical sync signal is within $\pm 0.5H$.

4. If the variation of CH-1 and/or CH-2 is out of the specified range ($\pm 0.5H$), readjust the phase of CH-1 or CH-2 whichever has the larger variation.

Note:

If the CH-1/CH-2 phase relative error is greatly out of the specified range ($\pm 0.5H$), there is a trouble that the reproduced picture fluctuates vertically in the video search mode.

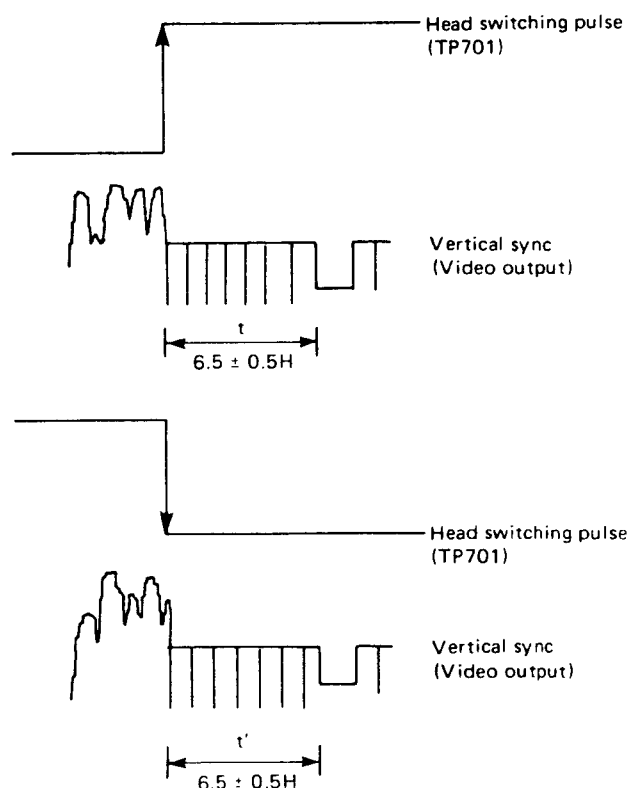


Figure 2-6.

STEP 9.**Checking of PAL recording phase (SP mode)**

1. Record a PAL video signal on an E-180 tape, and play it back.
2. Observe the output of TP701 (head switching pulse) and video output with an oscilloscope.
3. Check that the output level is at $6.5 \pm 2.0H$.

STEP 10.**Checking of NTSC recording phase (SP mode)**

1. Record a NTSC video signal on an E-180 tape, and play it back.
2. Observe the output of TP701 (head switching pulse) and video output with an oscilloscope.
3. Check that the output level is at $6.5 \pm 2.0H$.

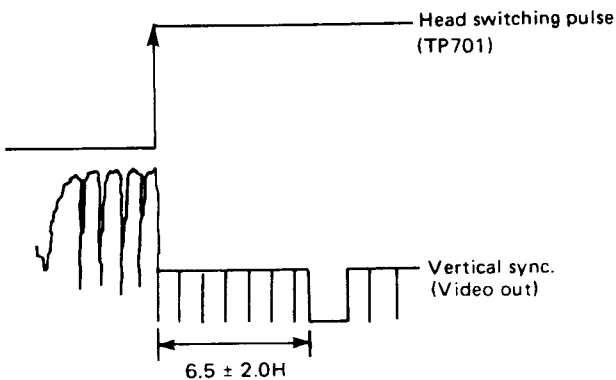


Figure 2-7.

STEP 11.**Adjustment of PAL false vertical sync in the slow/still mode.****Note:**

Before this adjustment, be sure to check that the adjustment of PAL CH-1/CH-2 relative error in STEP 6 has been properly done.

1. Put the unit in the PAL playback mode, using an E-180 tape.
2. Put the unit in the PAL still mode.
3. Observe the output of TP701 (head switching pulse) and video output with an oscilloscope, and adjust R7038 (3H slow/still FV sync. control) so that the output level is shown in Fig. 2-8.
4. Adjust R7038 so that there is the least of noise on TV monitor.

STEP 12.**Checking of PAL false vertical sync in the video search mode.**

1. Record a PAL video signal on an E-180 tape, and play it back.
2. Put the unit in the video search mode.
3. Check that the horizontal raster does not move up and down so noticeably on TV monitor.

STEP 13.**Adjustment of NTSC false vertical sync in the slow/still mode****Note:**

Before this adjustment, be sure to check that the adjustment of NTSC CH-1/CH-2 relative error in STEP 8 has been properly done.

1. Record a NTSC video signal on an E-180 tape, and play it back.
2. Put the unit in the still mode.
3. Observe the output of TP701 (head switching pulse) and video output with an oscilloscope, and adjust R7039 (2H slow/still FV sync. control) so that the output level is as shown in Fig. 2-8.
4. Adjust R7039 so that there is the least deviation of noise on TV monitor.

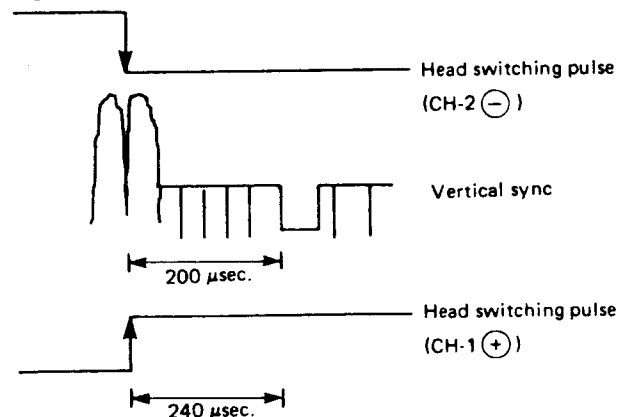


Figure 2-8.

STEP 14.**Adjustment of slow/still tracking preset****Note:**

- Use of a remote control transmitter is needed to put the unit in the slow mode.
- Before this adjustment of slow/still tracking preset, be sure to check that the slow tracking control located on the front panel has been set at its center click position.

(a) PAL SP mode:

1. Placing the unit in the PAL SP mode, record a video signal and play it back, then put the unit in the slow mode with use of a remote control transmitter.
2. Adjust R7034 so that there appear no noises on the monitor screen.

(b) PAL LP mode:

1. Placing the unit in the PAL LP mode, record a video signal and play it back, then put the unit in the slow mode with use of a remote control transmitter.
2. Adjust R7035 so that there is the least deviation of noise on the monitor screen.

(c) NTSC SP mode:

1. Placing the unit in the NTSC SP mode, record a video signal and play it back, then put the unit in the slow mode with use of a remote control transmitter.
2. Adjust R7036 so that there is the least deviation of noise on the monitor screen.

(d) NTSC EP mode:

1. Placing the unit in the NTSC EP mode, record a video signal and play it back, then put the unit in the slow mode with use of a remote control transmitter.
2. Adjust R7037 so that there is the least deviation of noise on the monitor screen.
 - If there appear noises on the monitor screen, adjust the control so that they move up and down first and then the picture will be stable for the viewer's preference.

■ ADJUSTMENT OF Y/C CIRCUIT**Adjustment of E-E level****Note:**

The video output must be terminated with a resistor of 75 ohms.

- Put the unit in the stop mode and connect a VTVM to TP402, and adjust R464 so that the VTVM reads the power voltage of $9.5 \pm 0.1V$.

1. Put the unit in the PAL SP record mode, using an E-180 tape.
2. Apply a colour bar signal (stair-step waveform) to the unit. And observe the video output with an oscilloscope.
3. Adjust R229 (E-E level control) so that the level becomes $1.0 \pm 0.05V_{p-p}$.

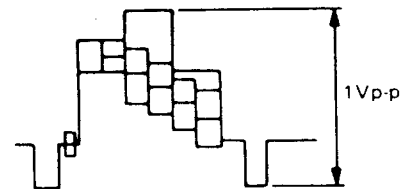


Figure 2-9.

• Test Point Layout

(Y/C PWB) —DUNTK2161HE—

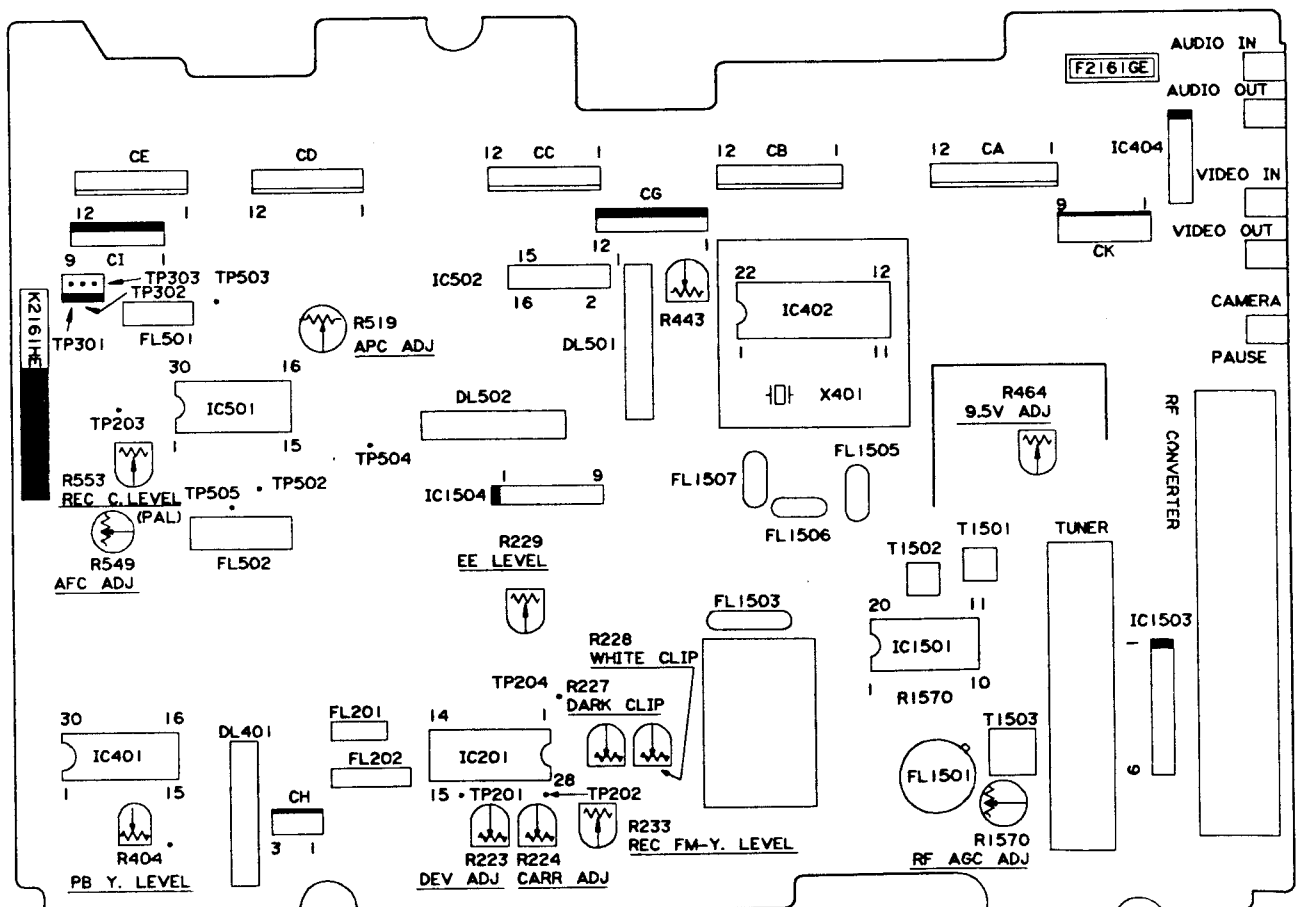


Figure 2-10.

Adjustment of FM carrier and deviation

Notes:

- Do not perform this adjustment except after replacement of IC201 or when the carrier control (3.8MHz) or deviation control (1.0MHz) has been adjusted improperly.
 - Before this adjustment, make sure that the E-E level and playback brightness level have been adjusted as specified.
- Set the input selector switch in the AUX mode. (with the AUX terminal given no signal).
 - Put the unit in the PAL SP record mode.
 - Connect a frequency counter to TP202, and adjust R224 (carrier control) so that the counter reads $3.8 \pm 0.05\text{MHz}$.
 - Apply a colour bar signal (stair-step waveform), then record and play it back.
 - Connect a 75 ohm resistor between the video output and ground, and observe the video output with an oscilloscope.
 - Adjust R223 (deviation control) so that the video playback level becomes $1.0 \pm 0.05\text{Vp-p}$. If the level is below 0.95Vp-p , turn the R213 counterclockwise. If the level is over 1.05Vp-p , turn the R213 clockwise.

Adjustment of dark clip and white clip

- Put the unit in the PAL SP record mode, using an E-180 tape.
- Apply a colour bar signal (stair-step waveform) to the unit.
- Observe the output of TP201 with an oscilloscope, and adjust R228 (white clip control) so that white output overshoot is within $80 \pm 5\%$, and then adjust R227 (dark clip control) so that dark output overshoot is within $50 \pm 5\%$.

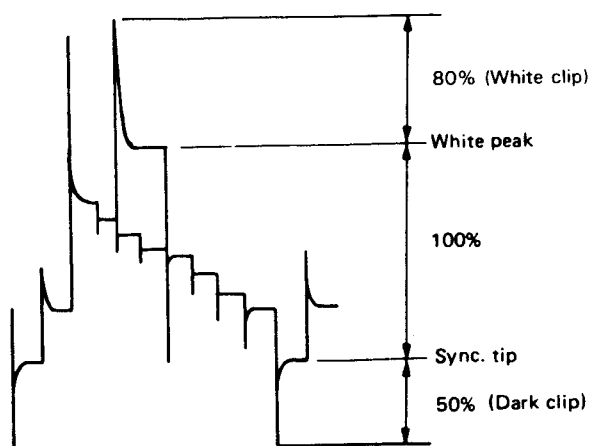


Figure 2-11.

Adjustment of automatic phase control (APC)

- Put the unit in the PAL SP playback mode, using an alignment tape (VR0CPSV).
- Apply a colour bar signal (stair-step waveform) to the unit, and connect a frequency counter to TP504.
- Adjust R517 (APC control) so that the counter reads 4.433619MHz .

Adjustment of automatic frequency control (AFC)

Note:

Connect a short clip between TP502 and TP503.

- Put the unit in the PAL SP record mode, using an E-180 tape.
- Apply a colour bar signal (stair-step waveform) to the unit, and connect a frequency counter to TP505.
- Adjust R549 (AFC control) so that the counter reads $625 \pm 5\text{kHz}$.

Adjustment of record current

a) In the case of PAL 4.43MHz

Note:

Before the adjustment, turn R233 (record luminance level control) to minimize the record current.

- Put the unit in the PAL SP record mode, using an E-180 tape.
- Apply a colour bar signal to the unit.
- Connect the plus sync slope of oscilloscope to TP31 and the minus sync slope to TP32 and observe the output waveforms available there.
- Adjust R553 (record chroma level control) so that the output level is within $25.0 \pm 2.5\text{mV}$.

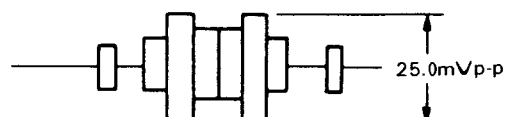


Figure 2-12.

b) In the case of NTSC 3.58MHz (refer to chroma circuit, Fig. 3-4)

Note:

Before the adjustment, turn R233 (record luminance level control) to minimize the record current.

- Put the unit in the NTSC SP record mode, using an E-180 tape.
- Apply a colour bar signal to the unit.
- Connect the plus sync slope of the oscilloscope to TP31 and the minus sync slope to TP32, and observe the output waveforms available there.

- Adjust R5810 (3.58MHz record chroma level control) so that the output level is within $30 \pm 2.0\text{mV}$.

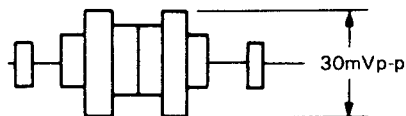


Figure 2-13.

c) In the case of SECAM
(refer to chroma circuit, Fig. 3-4)

Note:

Before the adjustment, turn R233 (record luminance level control) to minimize the record current

- Put the unit in the SECAM SP record mode, using an E-180 tape.
- Apply a colour bar signal to the unit.
- Connect the plus sync slope of oscilloscope to TP31 and the minus sync slope to TP32 and observe the output waveforms available there.
- Adjust R5813 (SECAM record chroma level control) so that the output level is within $20 \pm 2\text{mV}$.

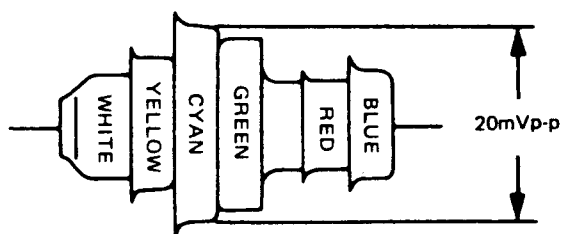


Figure 2-14.

d) Adjustment of record luminance level

- Put the unit in the PAL SP playback mode, using an E-180 tape.
- Apply a colour bar signal to the unit.
- Connect the plus sync slope of oscilloscope to TP31 and the minus sync slope to TP32 and observe the output waveforms available there.
- Adjust R233 (record luminance level control) so that the output level is within $100 \pm 10\text{mV}$.

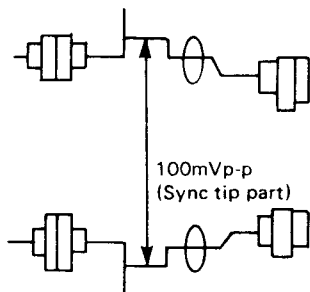


Figure 2-15.

Adjustment of playback luminance level

Note:

The video output must be terminated with a resistor of 75 ohms.

- Put the unit in the PAL SP playback mode, using an alignment tape (VR0CPSV).
- Observe the video output with an oscilloscope.
- Adjust R404 (playback luminance level control) so that the output level is $1.0 \pm 0.05\text{Vp-p}$.

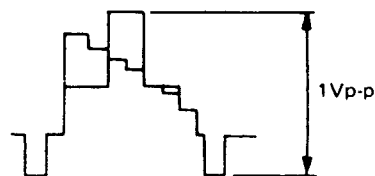


Figure 2-16.

Adjustment of video level (NTSC trick mode)

- Record an NTSC colour signal using an E-180 tape and play it back, then put the unit in the still mode.
- Observe the output of TP301 (head switching pulse) and video output with an oscilloscope.
- Adjust R443 so that there is a video level difference of $\pm 0.1\text{V}$ between Channel-1 output (head switching pulse's High level) and Channel-2 output (head switching pulse's Low level).
- If the colour flicker is so noticeable on the TV monitor, finely adjust R443 so that there is the least deviation of flicker on the screen.

ADJUSTMENT OF CHROMA CIRCUIT

• Test point layout

(CHROMA PWB)

—DUNTK2160HE—

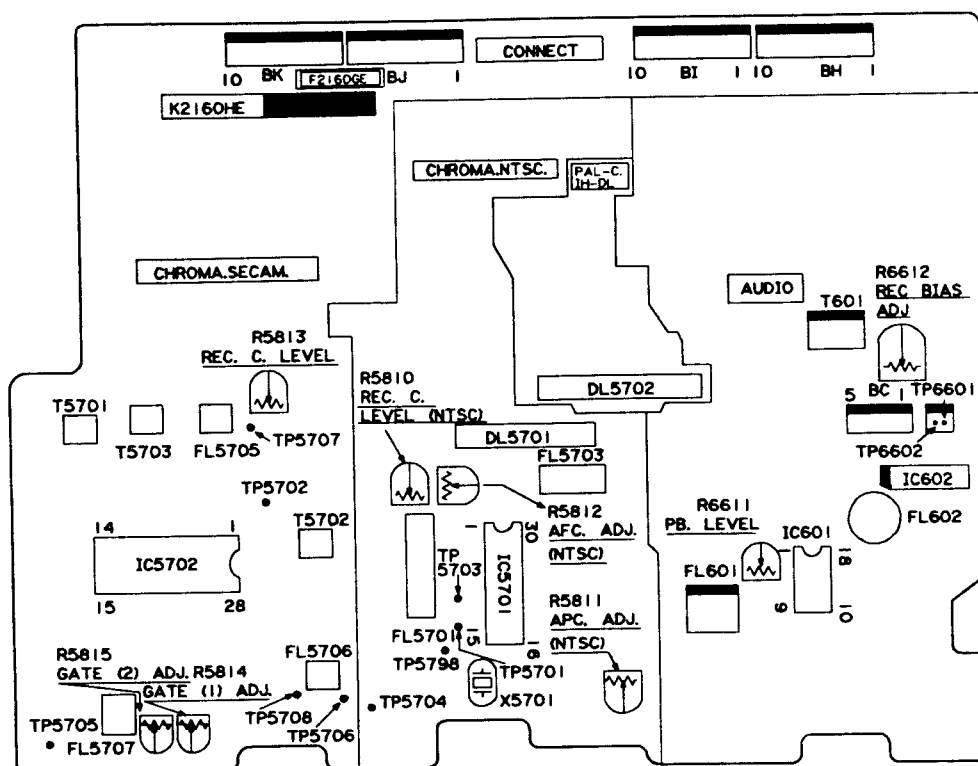


Figure 2-17.

■ ADJUSTMENT OF NTSC 3.58 CIRCUIT

Adjustment of AFC (R5812)

1. Apply a NTSC colour bar signal to the video input terminal.
2. Put the unit in the SP stop mode, and short TP5703 and TP5706.
3. Connect a frequency counter to TP5701 and adjust R5812 so that the counter reads 629 kHz.

Adjustment of APC (R5811)

1. Playback a NTSC tape (pre-recorded) in the SP mode and connect a frequency counter to TP5703.
2. Adjust R5811 so that the counter reads 3.579545 MHz (± 50 kHz).

Adjustment of colour record current (R5810)

1. Connect an oscilloscope to TP301 and TP302 (GND) of the head amplifier, and apply a NTSC colour bar signal to record it.
2. Set R233 (record luminance level control) at the minimum position and adjust R5810 so that the output is 30mVp-p.
3. Return R233 to the position which gives the output of 100mVp-p.

■ ADJUSTMENT OF SECAM CIRCUIT

Adjustment of record bell filter (T5703)

1. Connect an oscilloscope to TP5708.
2. Apply a SECAM colour bar signal to the unit and record it in the SP mode.
3. Adjust T5703 so that the output of chroma signal becomes flat as shown in Fig. 2-18.

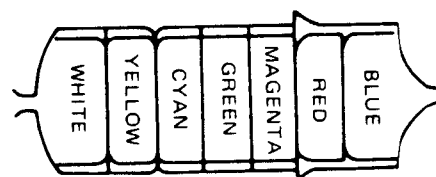


Figure 2-18.

Adjustment of record gate (R5814, R5815)

1. Apply a SECAM colour bar signal to the unit and record it in the SP mode.
2. Connect an oscilloscope to TP5702 and TP5705, and check that the output of chroma signal is as shown in Fig. 2-19.
3. Adjust R5814 and R5815 so that the intervals T_1 and T_2 become $2\mu\text{sec}$ and $4.2\mu\text{sec}$ respectively.

Adjustment of record equalizer (T5702)

Adjust T5702 so that the output at the point (a) is as shown in Fig. 2-19.

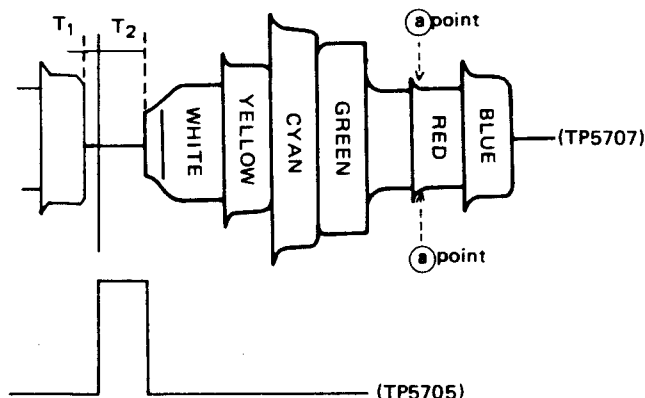


Figure 2-19.

Adjustment of SECAM colour record current (R5813)

1. Connect an oscilloscope to TP301 and TP302 (GND) of the head amplifier, and apply a SECAM colour bar signal to record it in the SP mode.
2. Set R233 (record luminance level control) at the minimum position and adjust R5813 so that the output is 20 mVp-p.
3. Return R233 to the position which gives the output of 100 mVp-p.

Adjustment of playback equalizer (T5701)

1. Playback a SECAM colour tape (pre-recorded) in the SP mode and connect an oscilloscope to TP5708 and TP5705.
2. Adjust T5701 so that the amplitude difference among each chroma signal becomes the least as shown in Fig. 2-20.

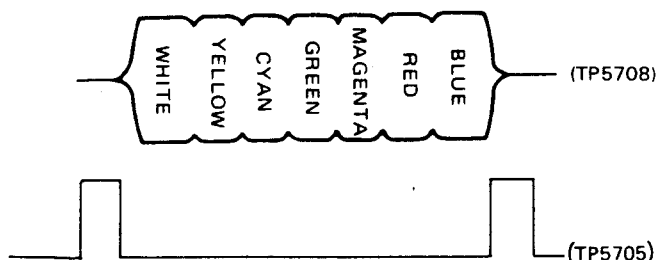


Figure 2-20.

ADJUSTMENT OF TUNER/IF, AUDIO CIRCUIT**■ TUNER IF ADJUSTMENT****Caution:**

Do not perform this adjustment except when either of the tuner, detection coil (T1501) and AFT coil (T1502) is replaced with a new one.

If any one of the above parts is replaced, perform the adjustment as follows.

1. Receive PAL broadcast and turn on AFT switch.
2. Connect an oscilloscope to pin ① of IC1504, and adjust the core belonging to the replaced part so that the burst level of video signal is equal to 1/2 of the horizontal sync level. See Fig. 2-21.
3. Readjust R1570 (RF AGC).

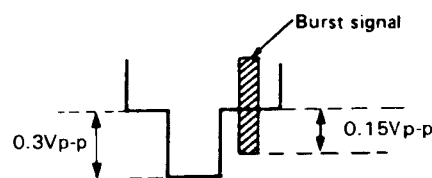


Figure 2-21.

Adjustment of RF AGC

Turn R1570 to the position where the waveform of horizontal sync signal shown in Fig. 2-21 begins to contract.

■ AUDIO ADJUSTMENT**Adjustment of record bias current (R6612)**

1. Connect a VTVM to TP6601(-) and TP6602(+).
2. Adjust R6612 so that the VTVM reads 2.3 mV.

Adjustment of playback audio level (R6611)

1. Connect a VTVM to the audio output terminal and playback an alignment tape (VR0CPSV).
2. Adjust R6611 so that the VTVM reads -9 dBm.

Adjustment of NTSC audio trap

1. Receive NTSC broadcast signal.
2. Connect an oscilloscope to pin ⑩ of IC1501.
3. Turn T1501 so that there appears the least deviation of noise on the oscilloscope (for the horizontal sync of video signal) in the audio mode.

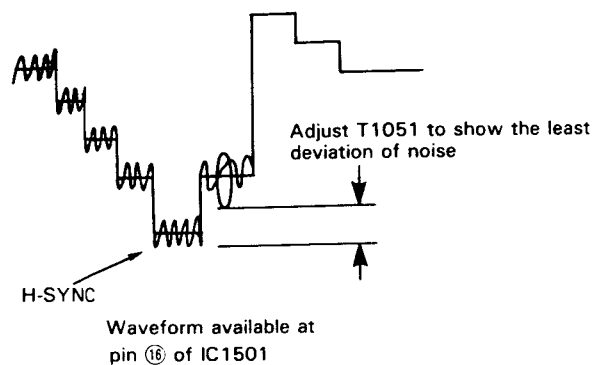


Figure 2-22.

■ ADJUSTMENT OF TIMER CIRCUIT

Note:

This model is equipped with a crystal oscillator (32 kHz) type timer.

The following adjustment is needed when the timer IC has been replaced or if there is a time count error for some reason. (Notice that the unit has been accurately factory-adjusted. Do not attempt to readjust this circuit if not needed.)

Before starting the adjustment, make the following connections with the test point connector on the printed face of the timer PWB.

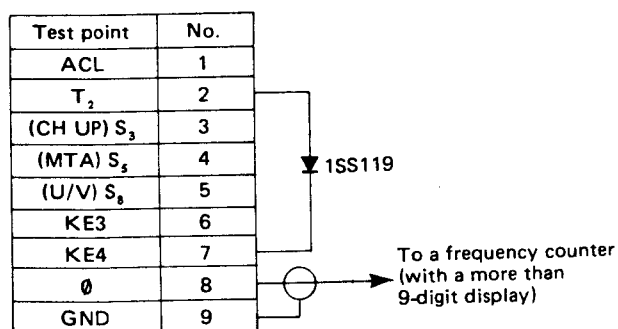


Figure 2-23.

Timer adjustment

1. Couple the connector in position on the timer PWB.
2. Press the ACL switch on the timer PWB.
(Now the digitron display will turn off.)
3. Adjust C5009 (trimming capacitor) so that the frequency counter may read the values listed below.
4. Finally disconnect the connector from the timer PWB.
(Flashing → Timer preset)

Condition	Adjustment value	Remarks
10–15°C	16383.962 ± 0.019 Hz	(Pace) –0.2 ± 0.1 sec/day
Higher than 15°C	16384.019 ± 0.019 Hz	(Pace) +0.1 ± 0.1 sec/day

Post-adjustment checking

Half a day to three days after the adjustment, check the accuracy for extra surety.

Adjustment of NTSC audio trap

1. Receive NTSC broadcast signal.
2. Connect an oscilloscope to pin ⑩ of IC1501.
3. Turn T1501 so that there appears the least deviation of noise on the oscilloscope (for the horizontal sync of video signal) in the audio mode.

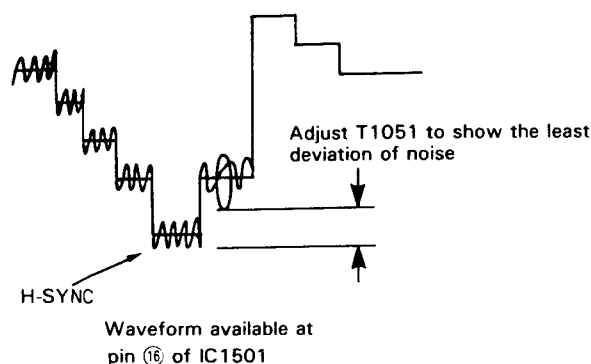


Figure 2-22.

■ ADJUSTMENT OF TIMER CIRCUIT

Note:

This model is equipped with a crystal oscillator (32 kHz) type timer.

The following adjustment is needed when the timer IC has been replaced or if there is a time count error for some reason. (Notice that the unit has been accurately factory-adjusted. Do not attempt to readjust this circuit if not needed.)

Before starting the adjustment, make the following connections with the test point connector on the printed face of the timer PWB.

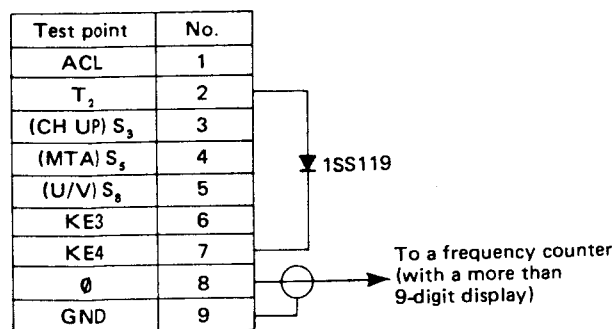


Figure 2-23.

Timer adjustment

1. Couple the connector in position on the timer PWB.
2. Press the ACL switch on the timer PWB.
(Now the digitron display will turn off.)
3. Adjust C5009 (trimming capacitor) so that the frequency counter may read the values listed below.
4. Finally disconnect the connector from the timer PWB.
(Flashing → Timer preset)

Condition	Adjustment value	Remarks
10–15°C	16383.962 ± 0.019 Hz	(Pace) –0.2 ± 0.1 sec/day
Higher than 15°C	16384.019 ± 0.019 Hz	(Pace) +0.1 ± 0.1 sec/day

Post-adjustment checking

Half a day to three days after the adjustment, check the accuracy for extra surety.

Adjustment of NTSC audio trap

1. Receive NTSC broadcast signal.
2. Connect an oscilloscope to pin ⑮ of IC1501.
3. Turn T1501 so that there appears the least deviation of noise on the oscilloscope (for the horizontal sync of video signal) in the audio mode.

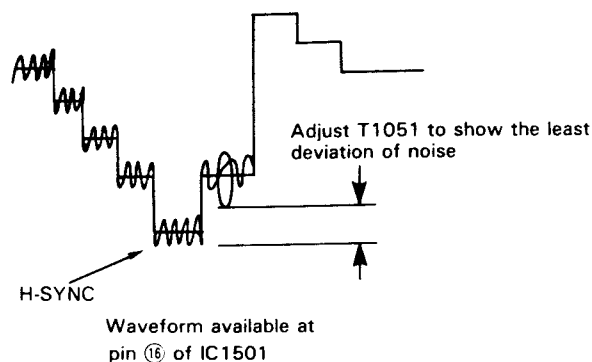


Figure 2-22.

■ ADJUSTMENT OF TIMER CIRCUIT

Note:

This model is equipped with a crystal oscillator (32 kHz) type timer.

The following adjustment is needed when the timer IC has been replaced or if there is a time count error for some reason. (Notice that the unit has been accurately factory-adjusted. Do not attempt to readjust this circuit if not needed.)

Before starting the adjustment, make the following connections with the test point connector on the printed face of the timer PWB.

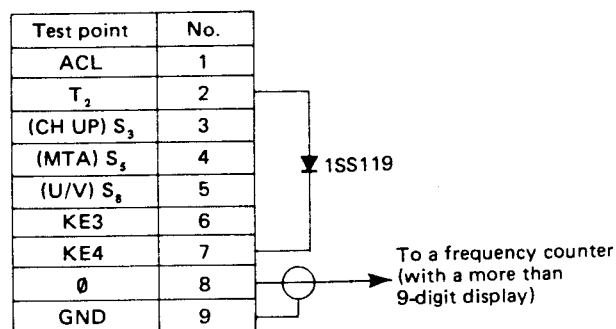


Figure 2-23.

Timer adjustment

1. Couple the connector in position on the timer PWB.
2. Press the ACL switch on the timer PWB.
(Now the digitron display will turn off.)
3. Adjust C5009 (trimming capacitor) so that the frequency counter may read the values listed below.
4. Finally disconnect the connector from the timer PWB.
(Flashing → Timer preset)

Condition	Adjustment value	Remarks
10–15°C	16383.962 ± 0.019 Hz	(Pace) –0.2 ± 0.1 sec/day
Higher than 15°C	16384.019 ± 0.019 Hz	(Pace) +0.1 ± 0.1 sec/day

Post-adjustment checking

Half a day to three days after the adjustment, check the accuracy for extra surety.

OVERALL SCHEMATIC DIAGRAM

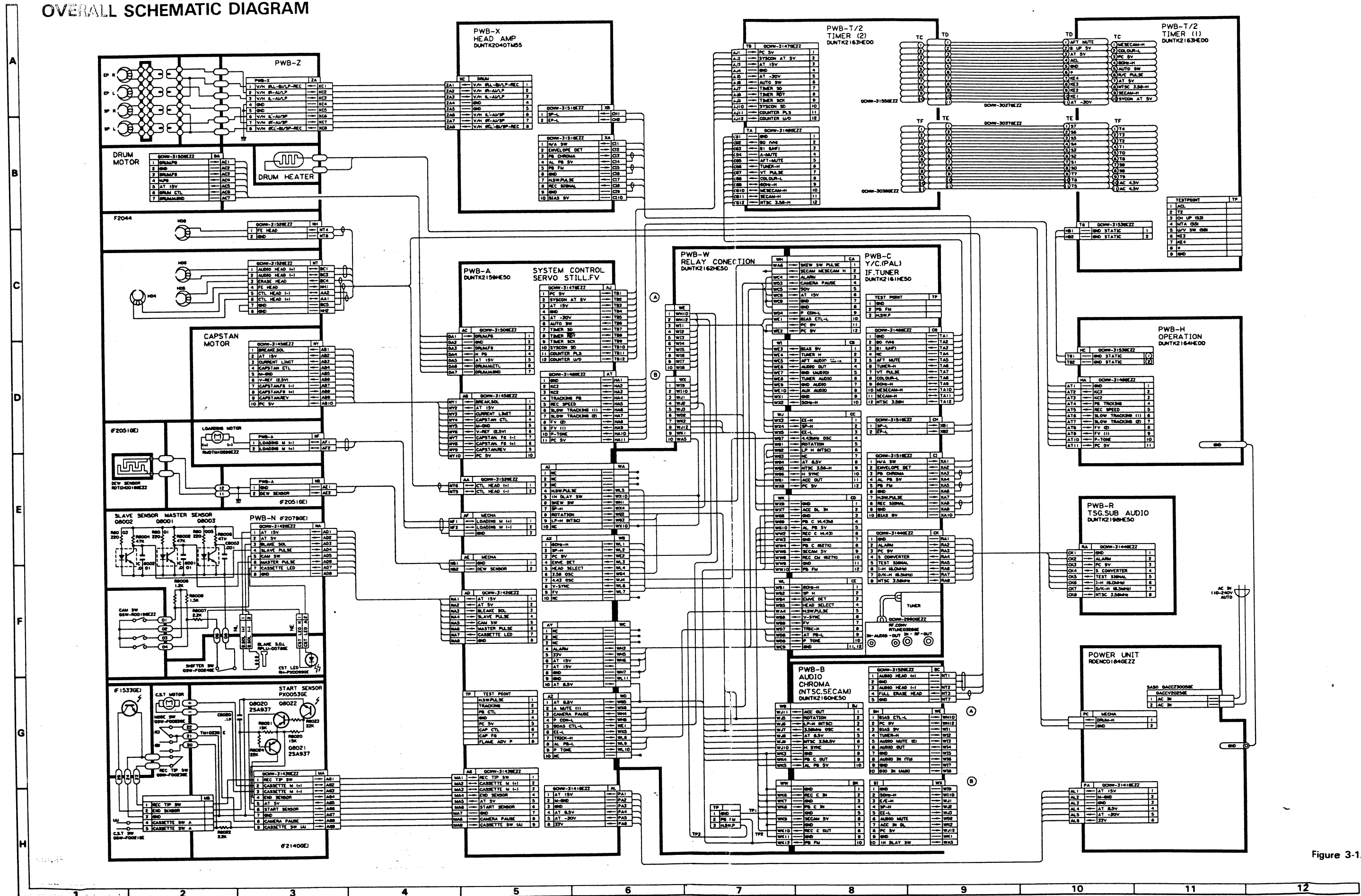


Figure 3-1.

PWB-A, SERVO CIRCUIT SCHEMATIC DIAGRAM

NOTE: For Wiring Side PWB, refer to Fig. 3-14.

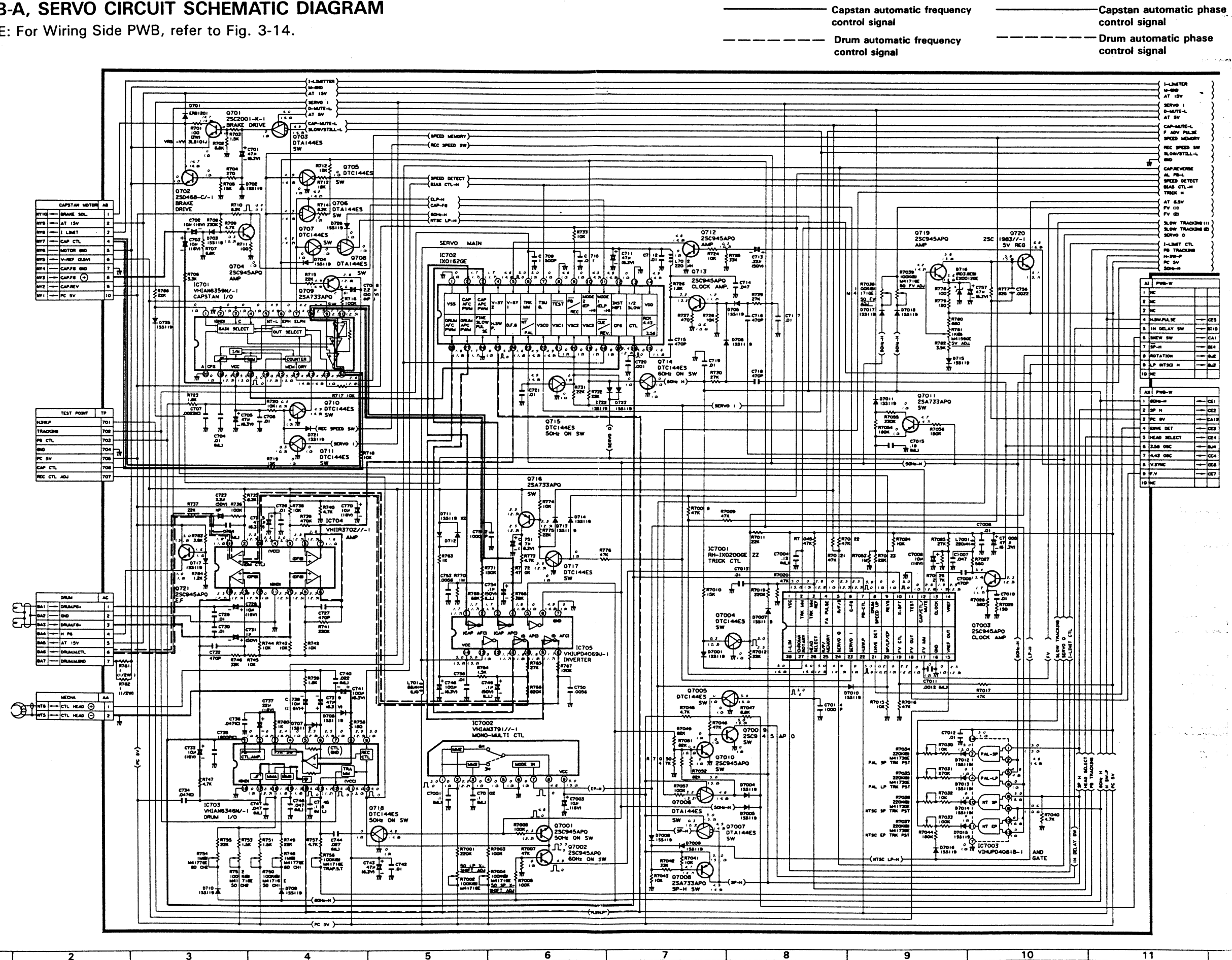


Figure 3-2.

NOTE: For Wiring Side PWB, refer to Fig. 3-14.

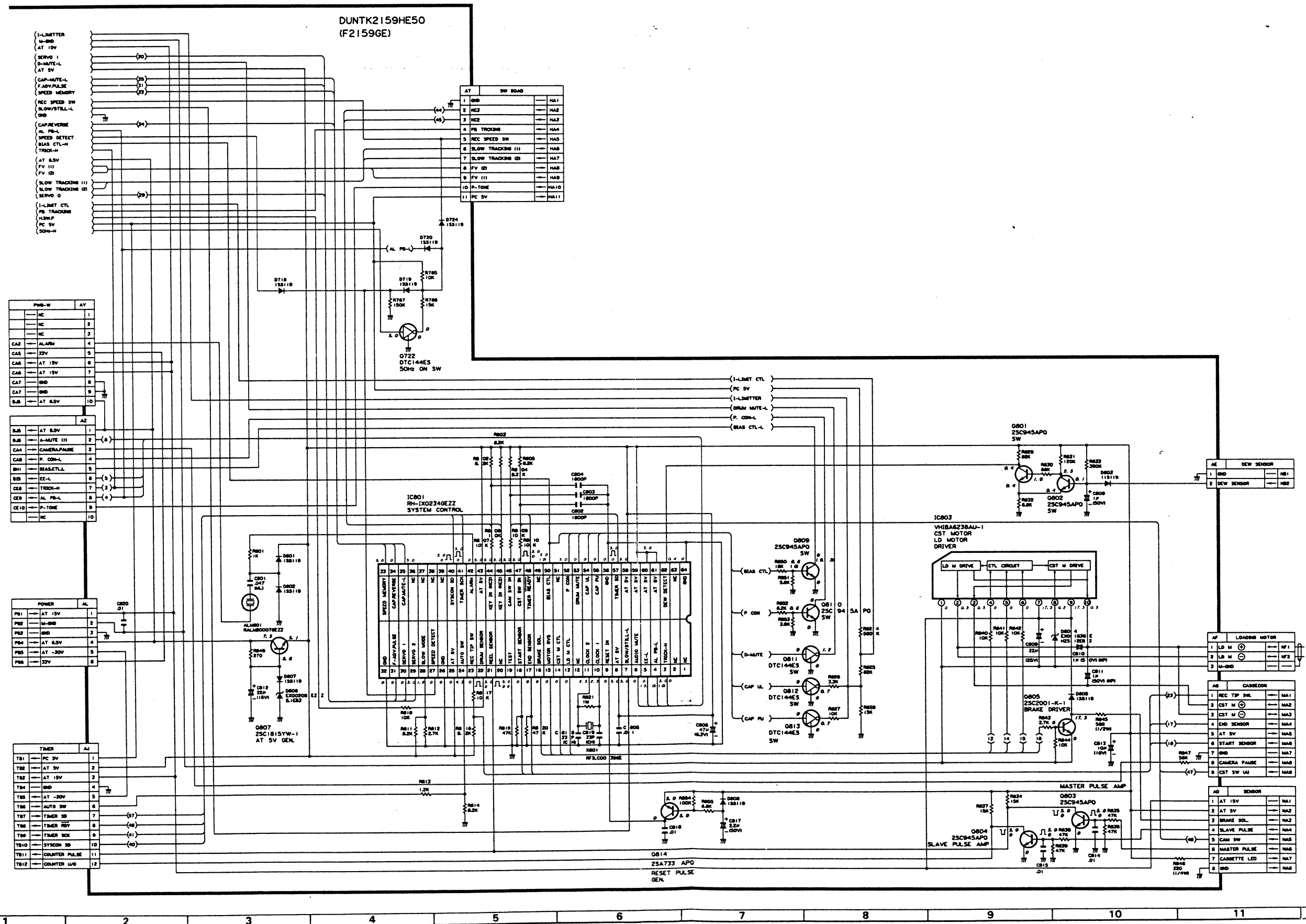


Figure 3-3.

PWB-B, AUDIO/CHROMA CIRCUIT SCHEMATIC DIAGRAM (NTSC, SECAM)

NOTE: For Wiring Side PWB, refer to Fig. 3-15.

- _____ Playback chrominance signal (SECAM) _____ Record chrominance signal (NTSC 3.58)
 _____ Playback chrominance signal (NTSC 3.58) _____ Record chrominance signal (SECAM)
 _____ Audio record signal _____ Audio playback signal
 Audio E-E signal

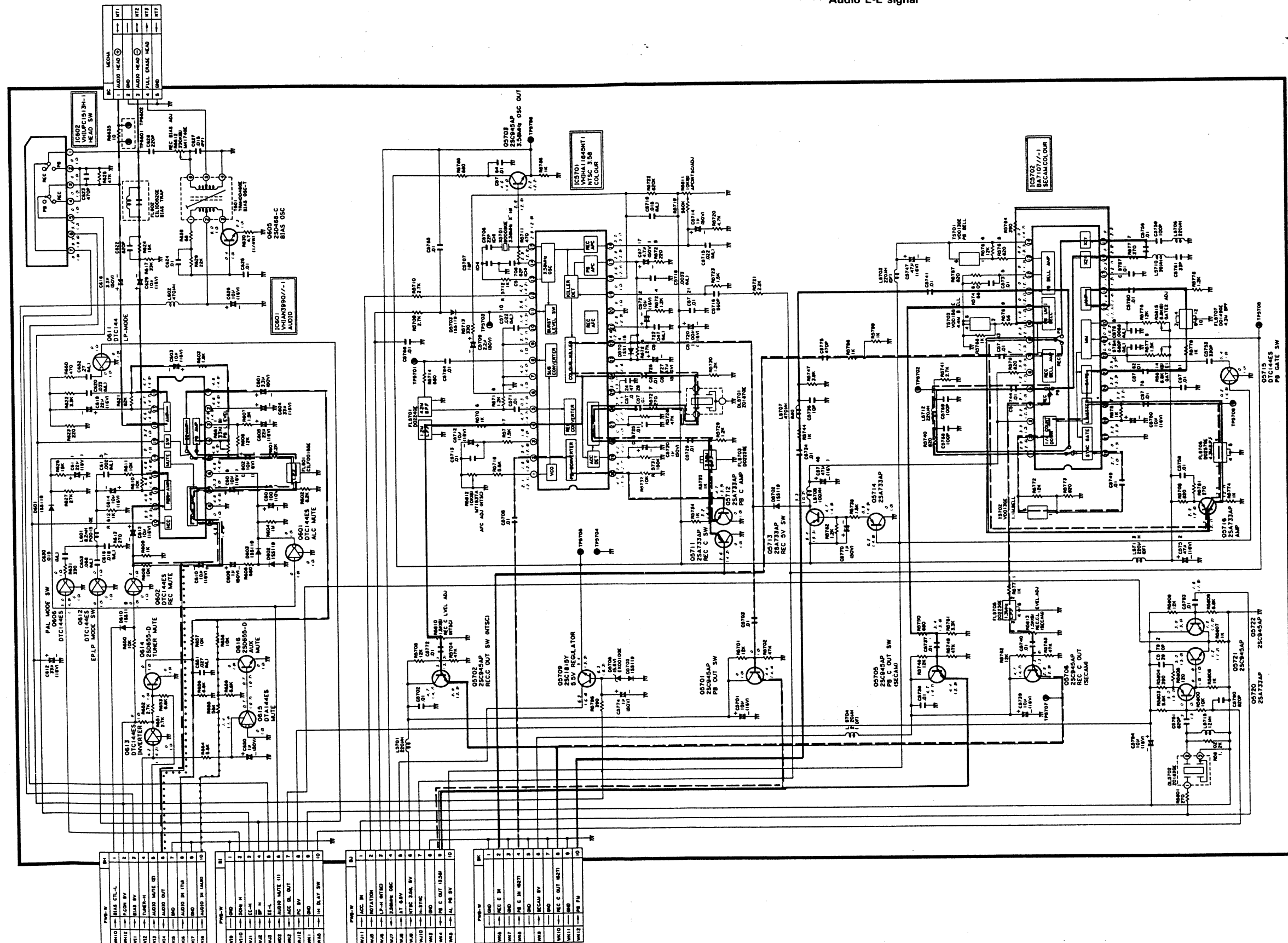


Figure 3-4.

NOTE: For Wiring Side PWB, refer to Fig. 3-16.

NOTE: For Wiring Side PWB, refer to Fig. 3-16.



PWB-R, TEST SIGNAL SOUND CONVERTER CIRCUIT SCHEMATIC DIAGRAM/ PWB-C, IF CIRCUIT SCHEMATIC DIAGRAM

NOTE: For Wiring Side PWB, refer to Figs. 3-16 and 3-19.

Video signal
(PAL, SECAM, NTSC 4.43)
Video output signal

Video signal (NTSC 3.58)
Audio signal

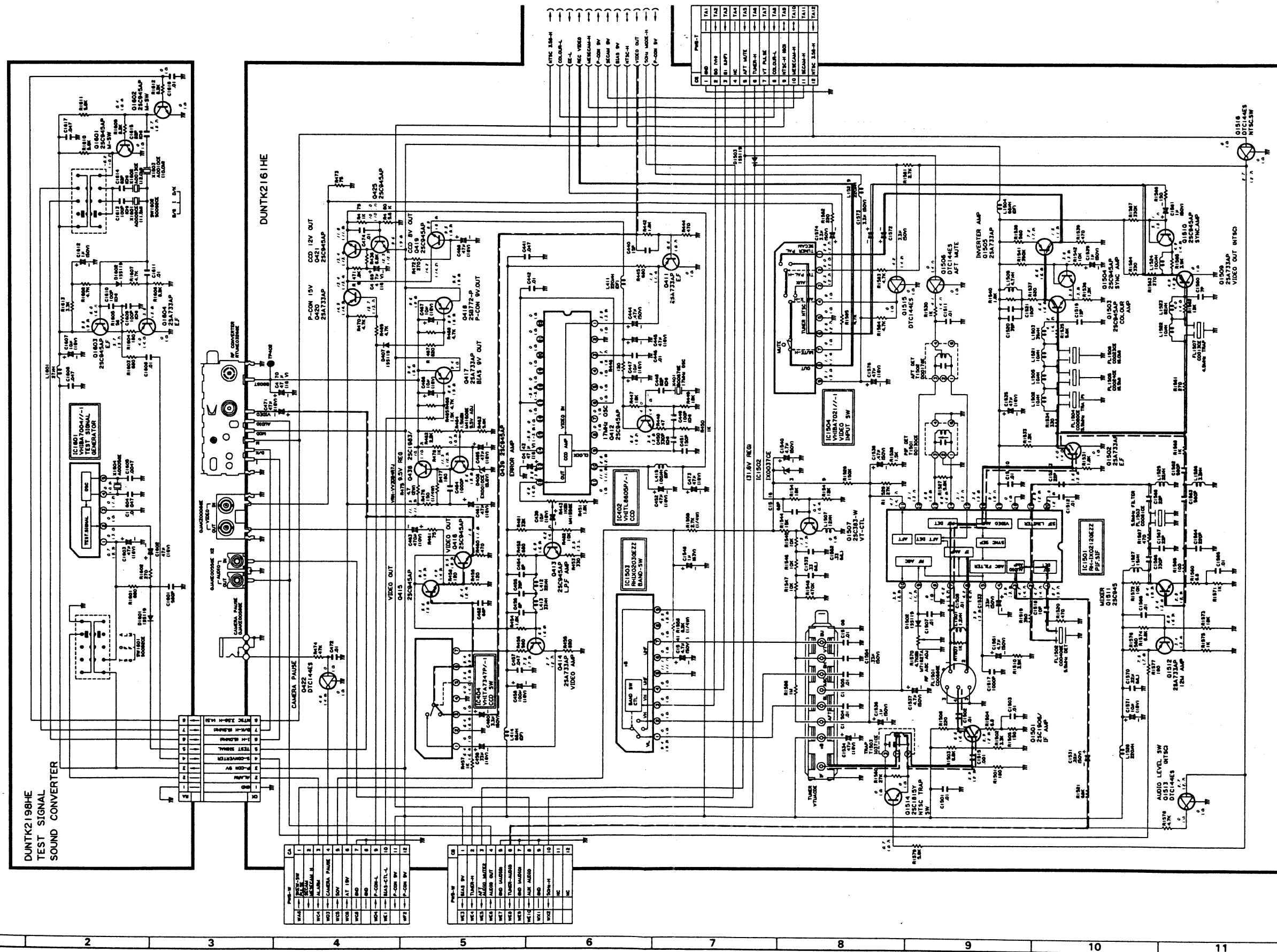


Figure 3-G.

NOTE: For Wiring Side PWB, refer to Fig. 3-17.



PWB-X, HEAD AMPLIFIER CIRCUIT SCHEMATIC DIAGRAM

NOTE: For Wiring Side PWB, refer to Fig. 3-20.

————— Record signal
 (Y signal + chrominance signal) - - - - - Playback luminance signal
 - - - - - Playback chrominance signal

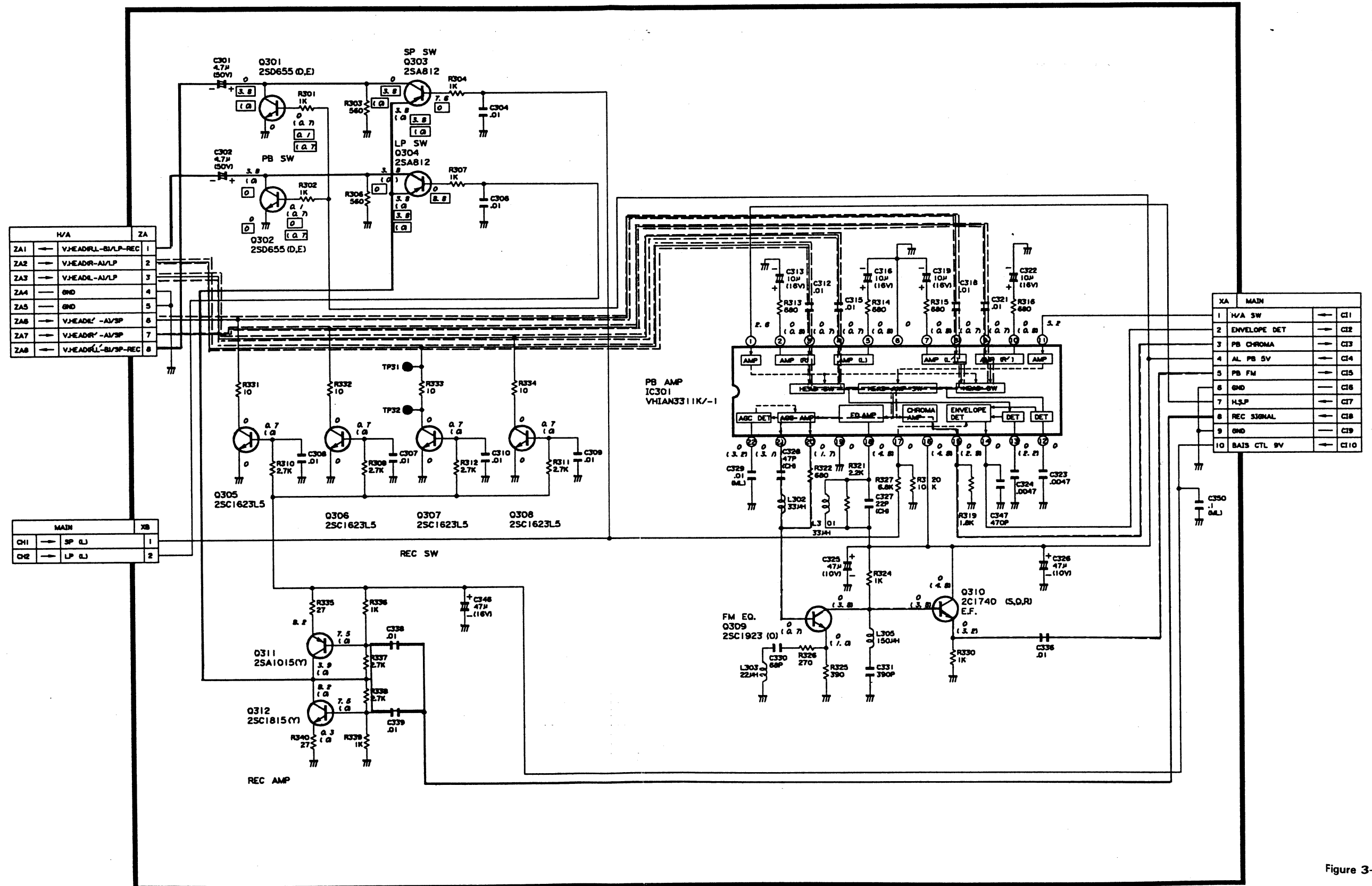


Figure 3-8.

PWB-P, POWER CIRCUIT SCHEMATIC DIAGRAM

NOTE: For Wiring Side PWB, refer to Fig. 3-21.

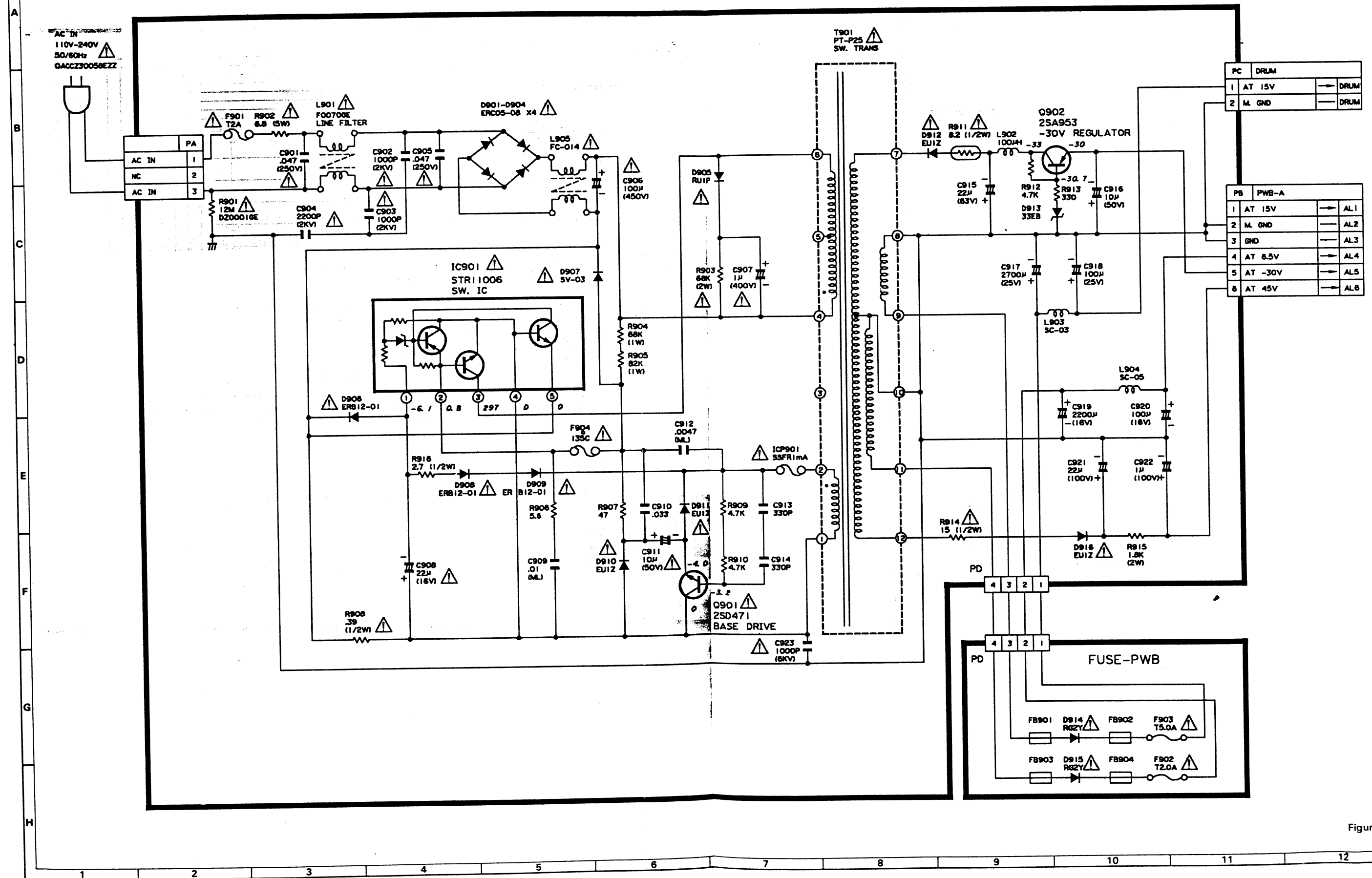


Figure 3-9.

PWB-H, OPERATION CIRCUIT SCHEMATIC DIAGRAM

NOTE: For Wiring Side PWB, refer to Fig. 3-18.

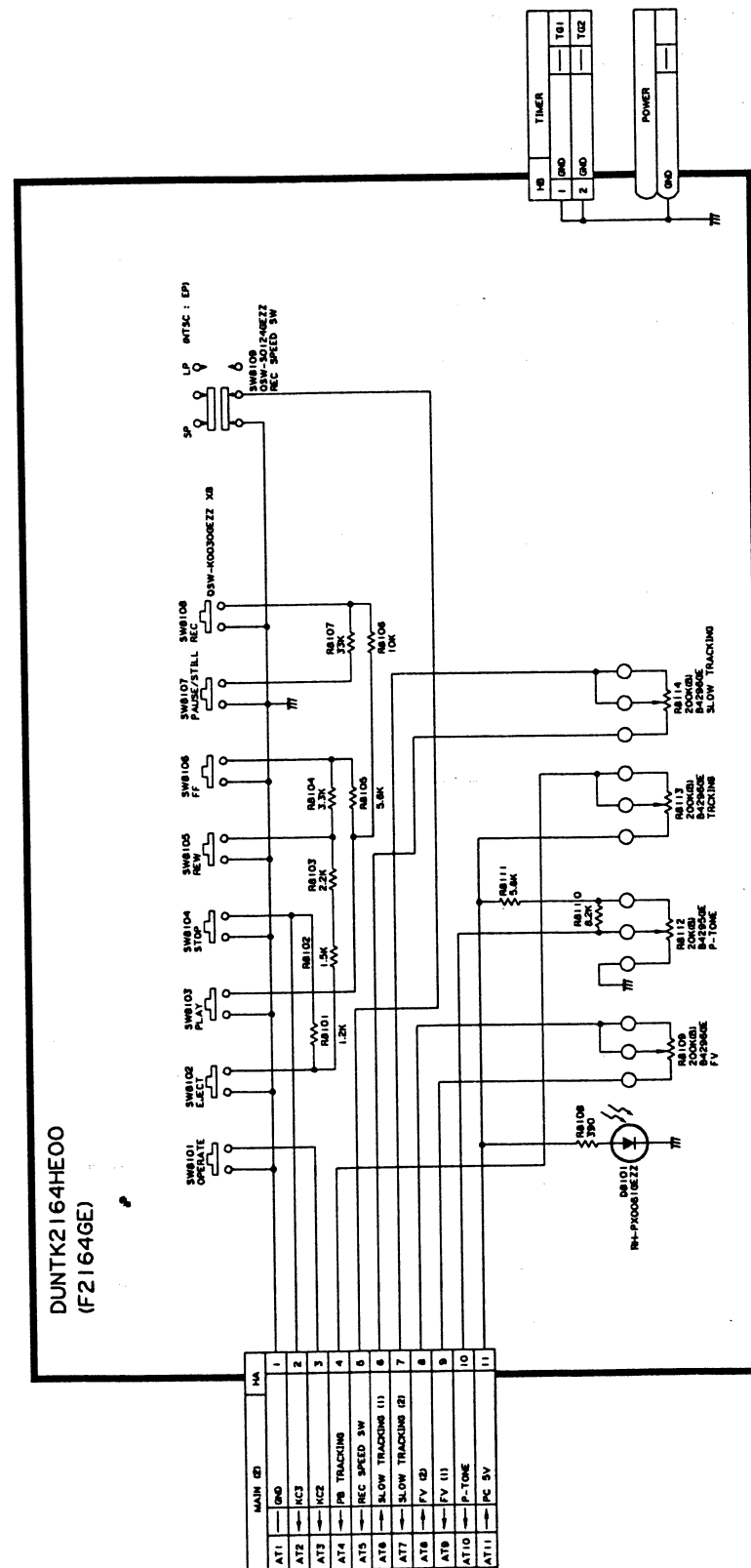


Figure 3-10.

REMOTE CONTROL CIRCUIT SCHEMATIC DIAGRAM

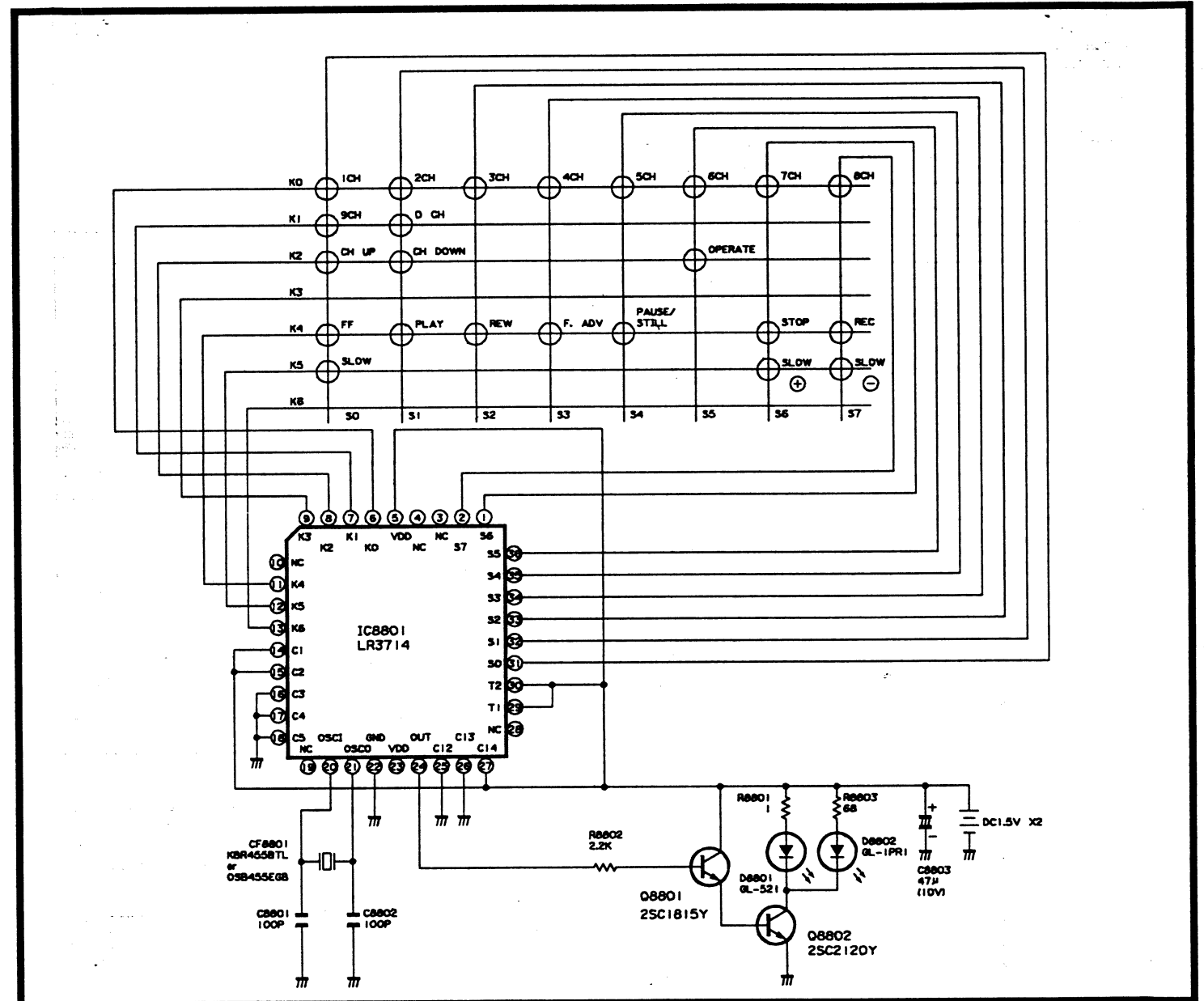


Figure 3-11.

TUNER SCHEMATIC DIAGRAM

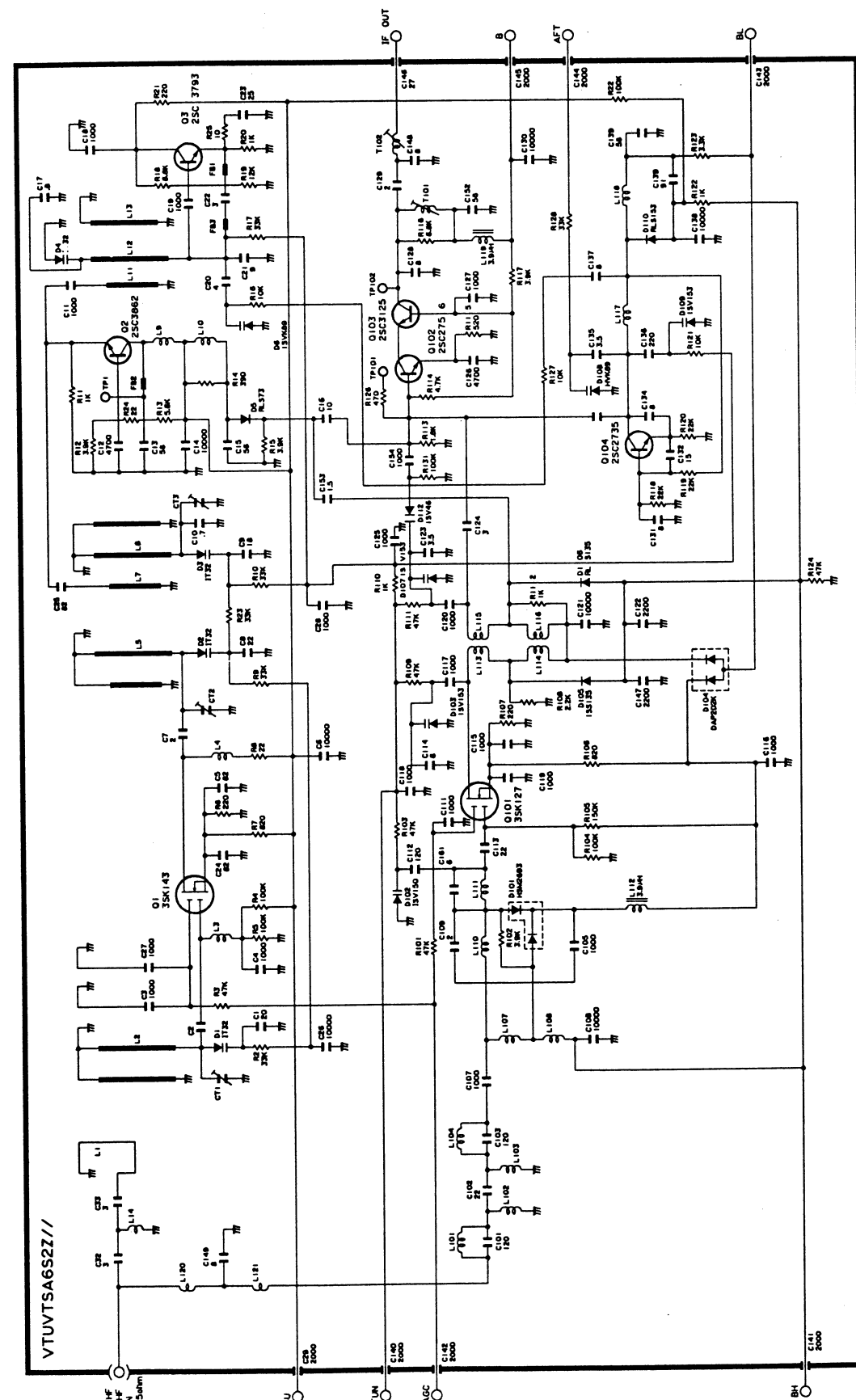


Figure 3-12.

RF CONVERTER SCHEMATIC DIAGRAM

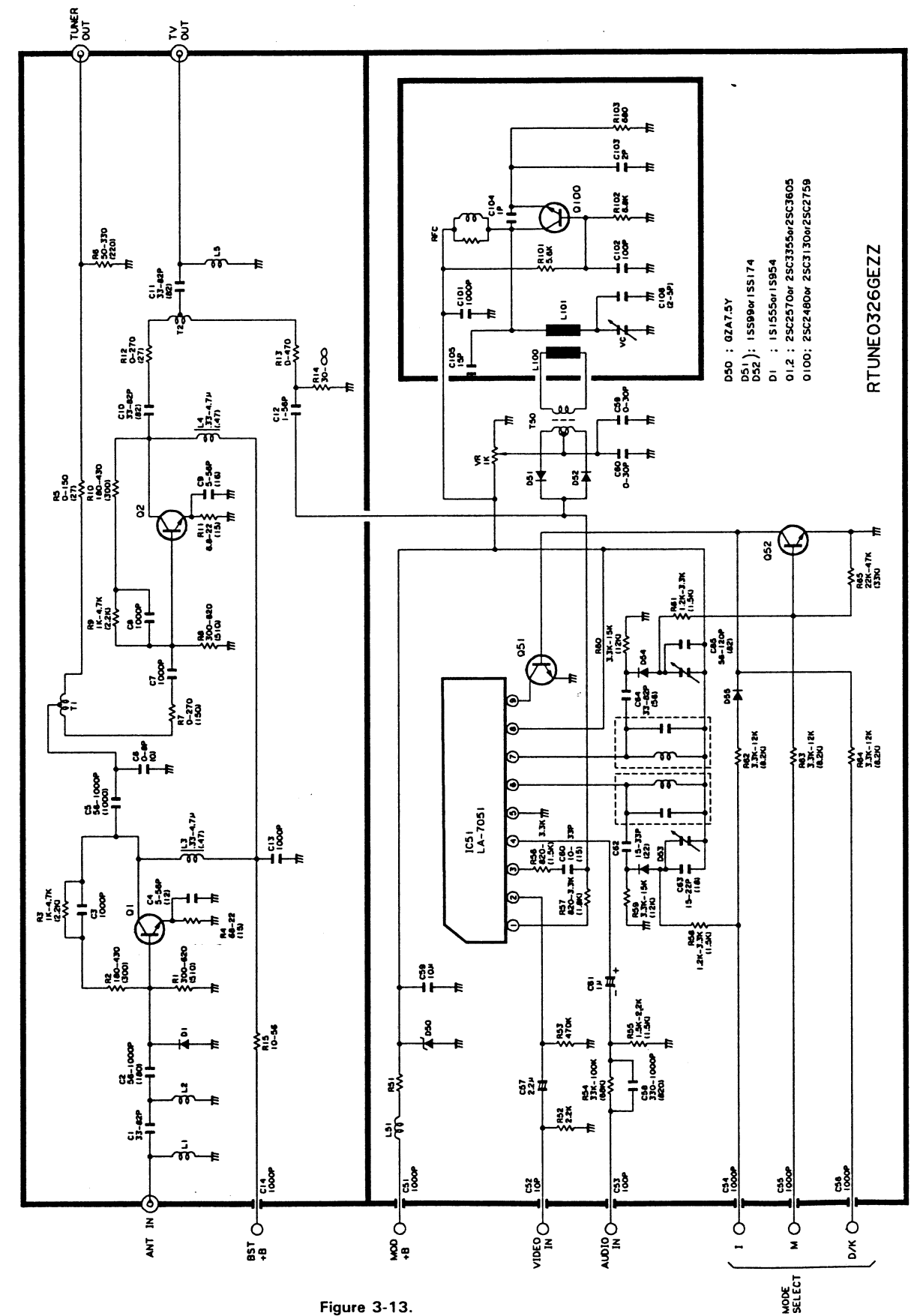
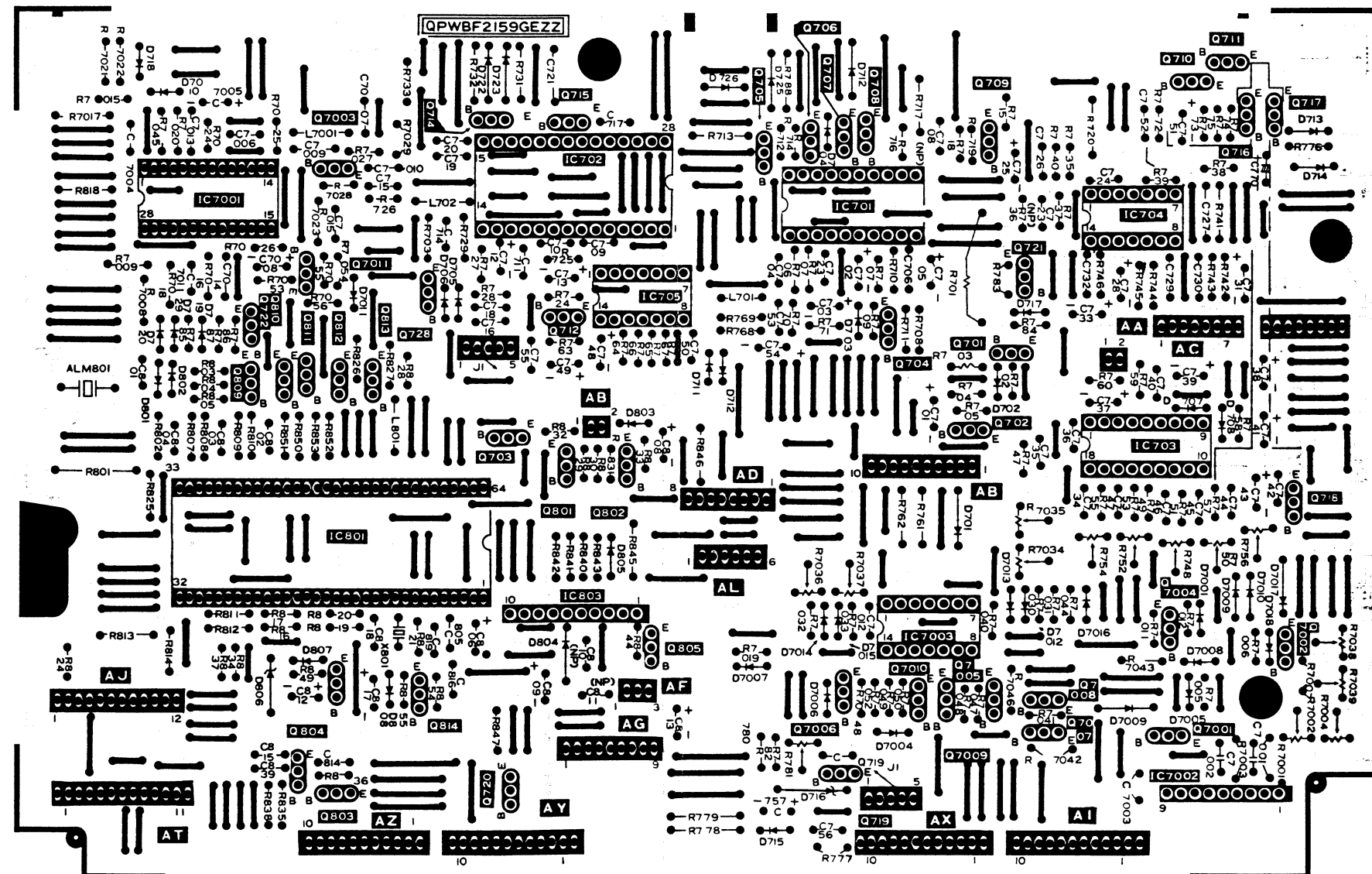
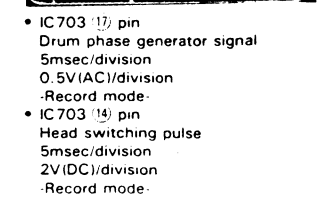
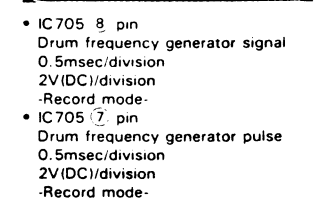
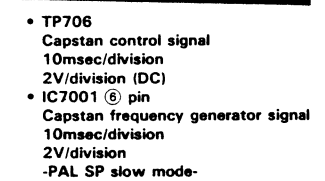
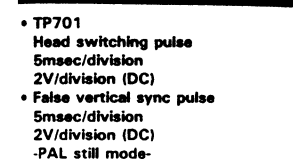
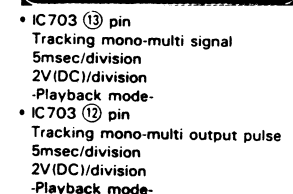
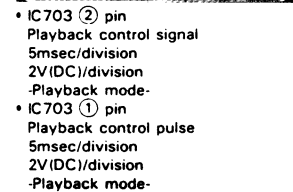
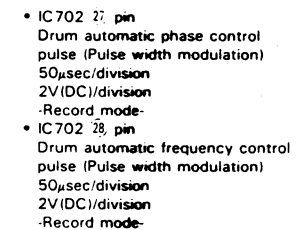
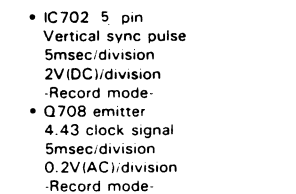
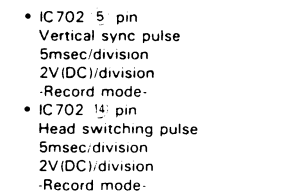
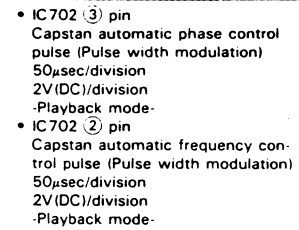
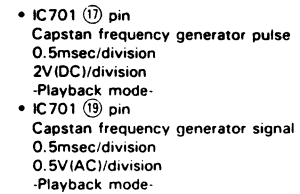


Figure 3-13.

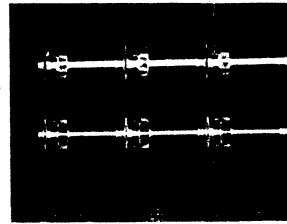
NOTE: For Schematic Diagram, refer to Figs 3-2 and 3-3.

NOTE: For Schematic Diagram, refer to Figs 3-2 and 3-3.

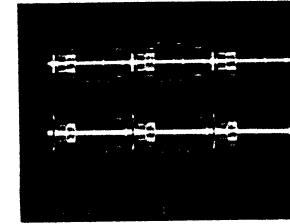


PWB-B, AUDIO/CHROMA CIRCUIT WIRING SIDE PWB

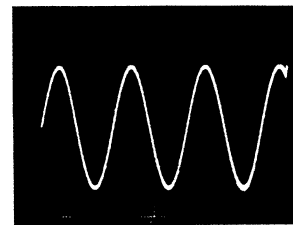
NOTE: For Schematic Diagram, refer to Fig. 3-4.



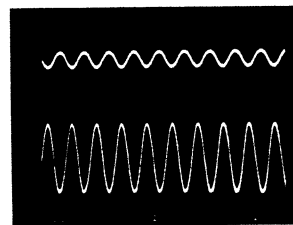
- IC5701 ② pin
Playback chrominance signal
20 μ sec/division
0.1V/division
- IC5701 ① pin
Playback chrominance signal
20 μ sec/division
0.2V/division
-Playback mode-



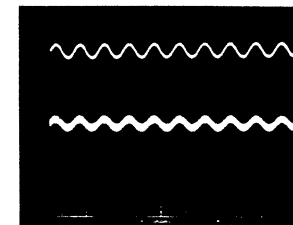
- IC5701 ② pin
NTSC 3.58MHz signal
20 μ sec/division
0.1V/division
- Q5702 Base
NTSC 3.58MHz signal
20 μ sec/division
0.1V/division
-Record mode-



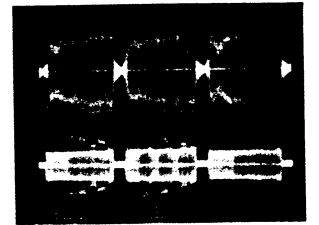
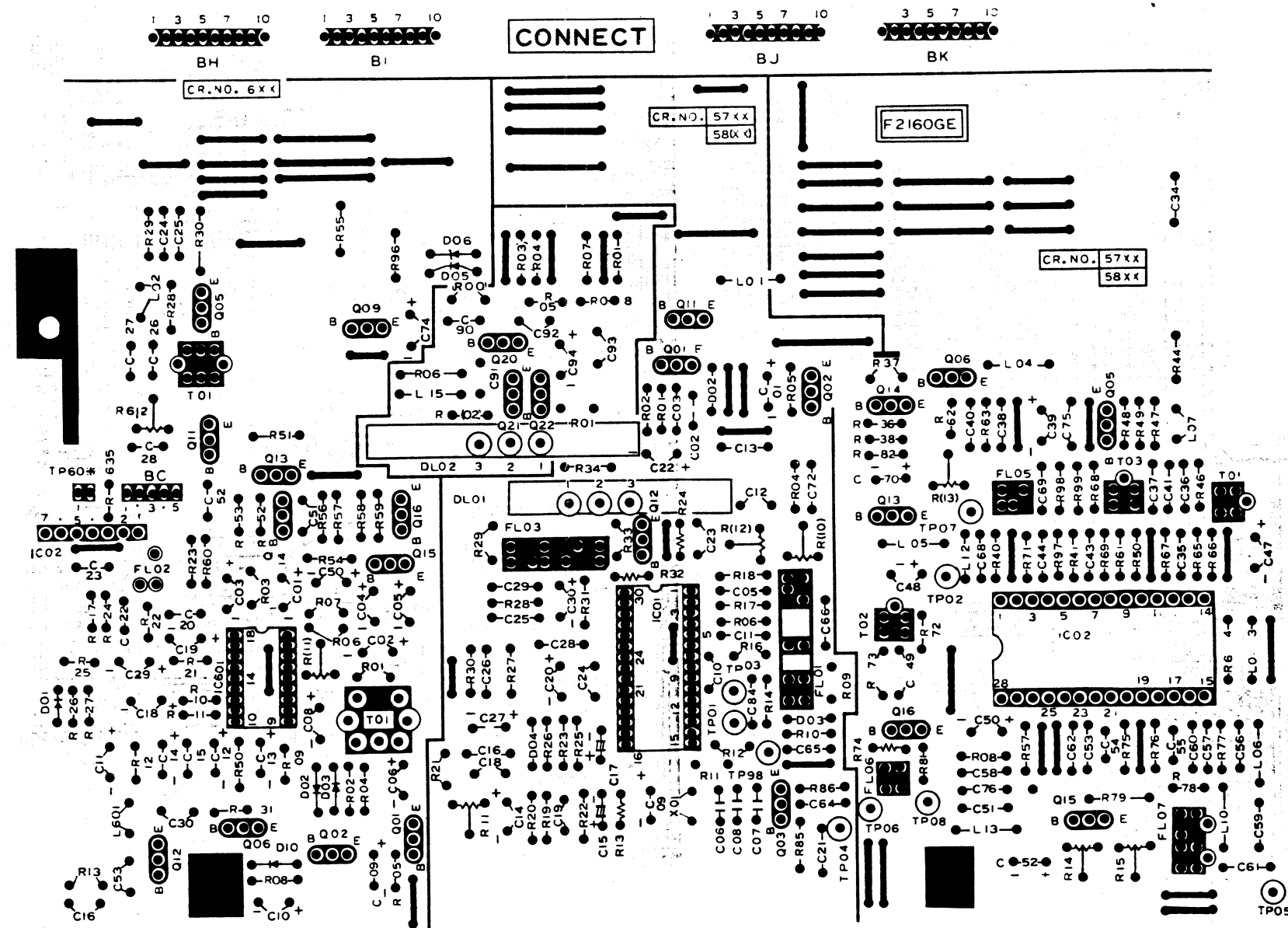
- T601 ③ pin
Bias oscillator signal
5 μ sec/division
20V/division
-Record mode-



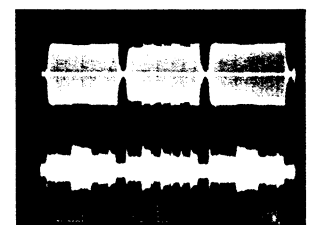
- IC601 ⑱ pin
Audio signal (1kHz)
1msec/division
50mV/division
- IC601 ⑨ pin
Audio signal (1kHz)
1msec/division
0.5V/division
-Playback mode-



- IC601 ⑪ pin
Audio signal
1msec/division
50mV/division
- IC601 ⑩ pin
Audio signal
1msec/division
50mV/division
-Record mode-



- TP5708
Playback chrominance signal
20 μ sec/division
0.2V/division
- Q5705 Base
Playback chrominance signal
20 μ sec/division
0.1V/division
-SECAM Playback mode-

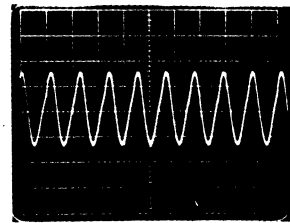


- TP5708
Chrominance signal
20 μ sec/division
1V/division
- Q5706 Base
Chrominance signal
20 μ sec/division
50mV/division
-SECAM record mode-

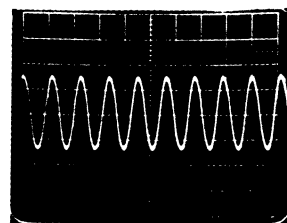
Figure 3-15.

PWB-C, Y/C, IF CIRCUIT WIRING SIDE PWB

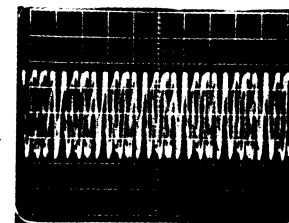
NOTE: For Schematic Diagram, refer to Figs. 3-5 and 3-6.



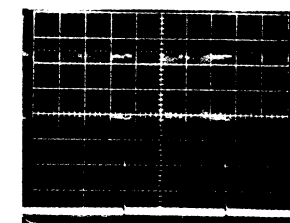
• TP502
4.435572 MHz oscillator signal
0.2 μ sec/division
0.2V(AC)/division
-Record mode-



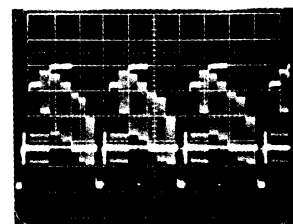
• TP504
4.433619 MHz oscillator signal
0.2 μ sec/division
0.2V(AC)/division
-Playback mode-



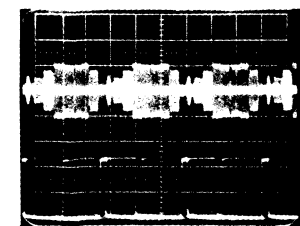
• TP505
Sub-converter output signal
0.5 μ sec/division
0.2V(AC)/division
-Playback mode-



• Connector CE @ pin
Vertical sync pulse
5msec/division
1V(DC)/division
-Record mode-

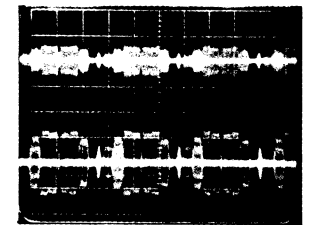


• Video output terminal
(Terminated with 75 ohm resistor)
Video output signal
20 μ sec/division
0.2V(AC)/division
-E-E mode-



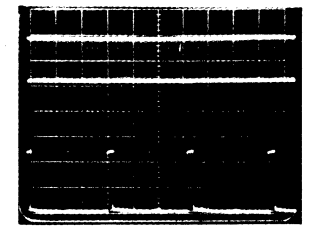
• Q520 emitter
Record chrominance output signal
20 μ sec/division
50mV(AC)/division
-Record mode-

• IC201 @ pin
Horizontal sync pulse
20 μ sec/division
2V(DC)/division
-Record mode-



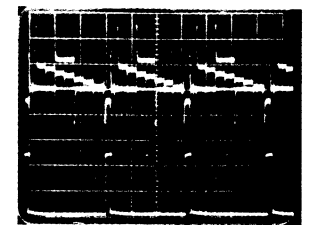
• Q501, Q502 emitter
Playback chrominance signal
20 μ sec/division
0.5V(AC)/division
-Playback mode-

• Q506, Q507, Q505 emitter
Playback chrominance signal
20 μ sec/division
0.1V(AC)/division
-Playback mode-



• TP202
Luminance FM signal
20 μ sec/division
0.5V(AC)/division
-Record mode-

• IC201 @ pin
Horizontal sync pulse
20 μ sec/division
2V(DC)/division
-Record mode-



• TP201
Preemphasis signal (Y signal)
20 μ sec/division
0.2V(AC)/division
-Record mode-

• IC 201 @ pin
Horizontal sync pulse
20 μ sec/division
2V(DC)/division
-Record mode-

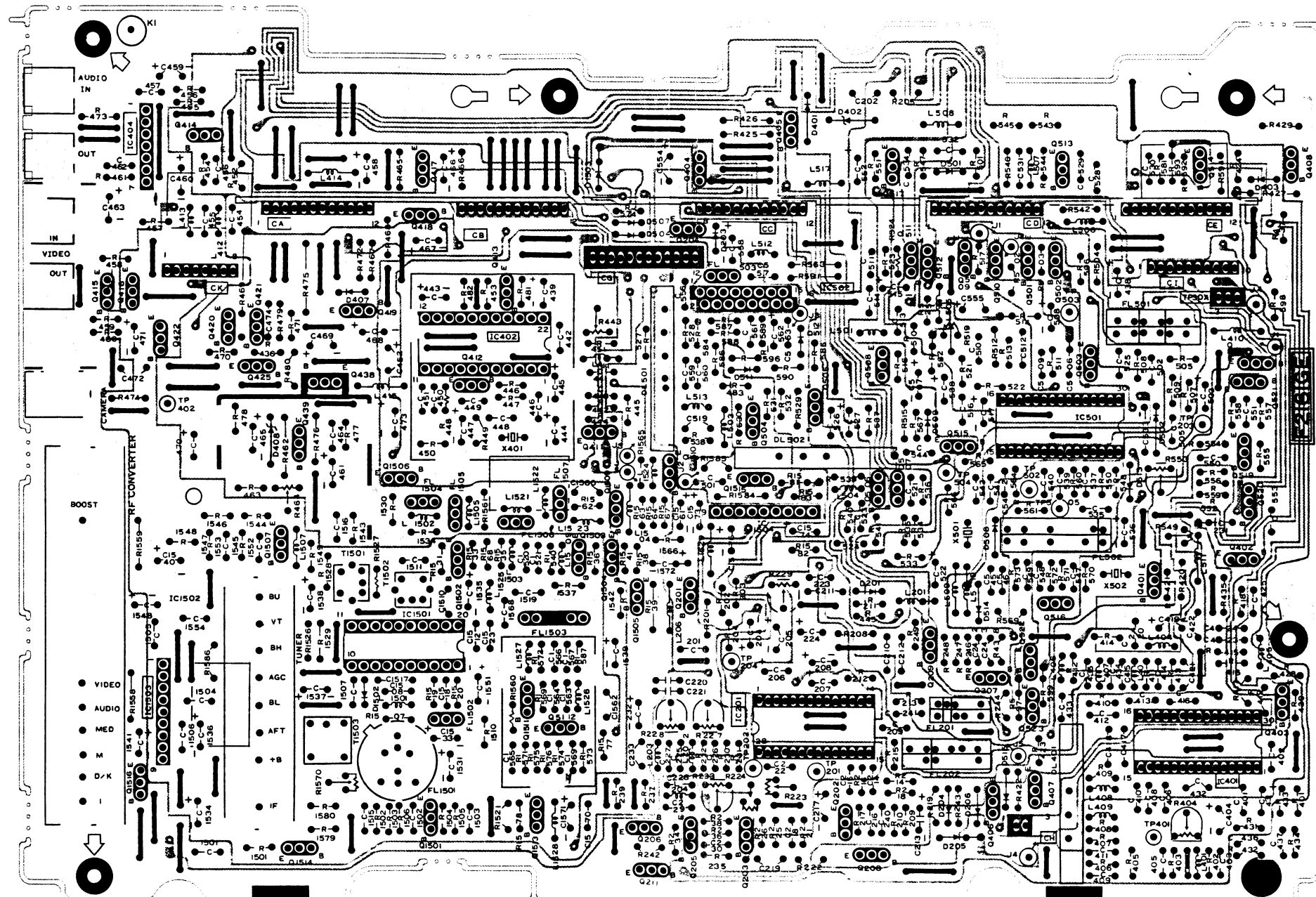
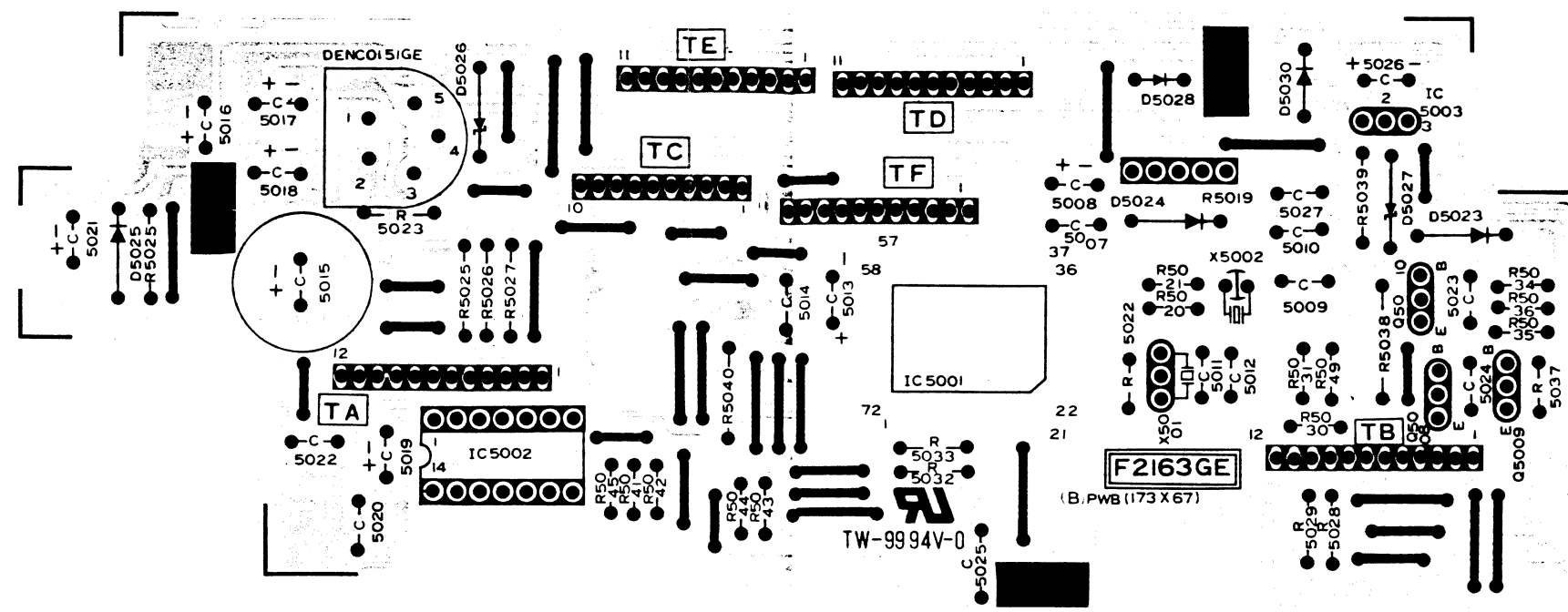
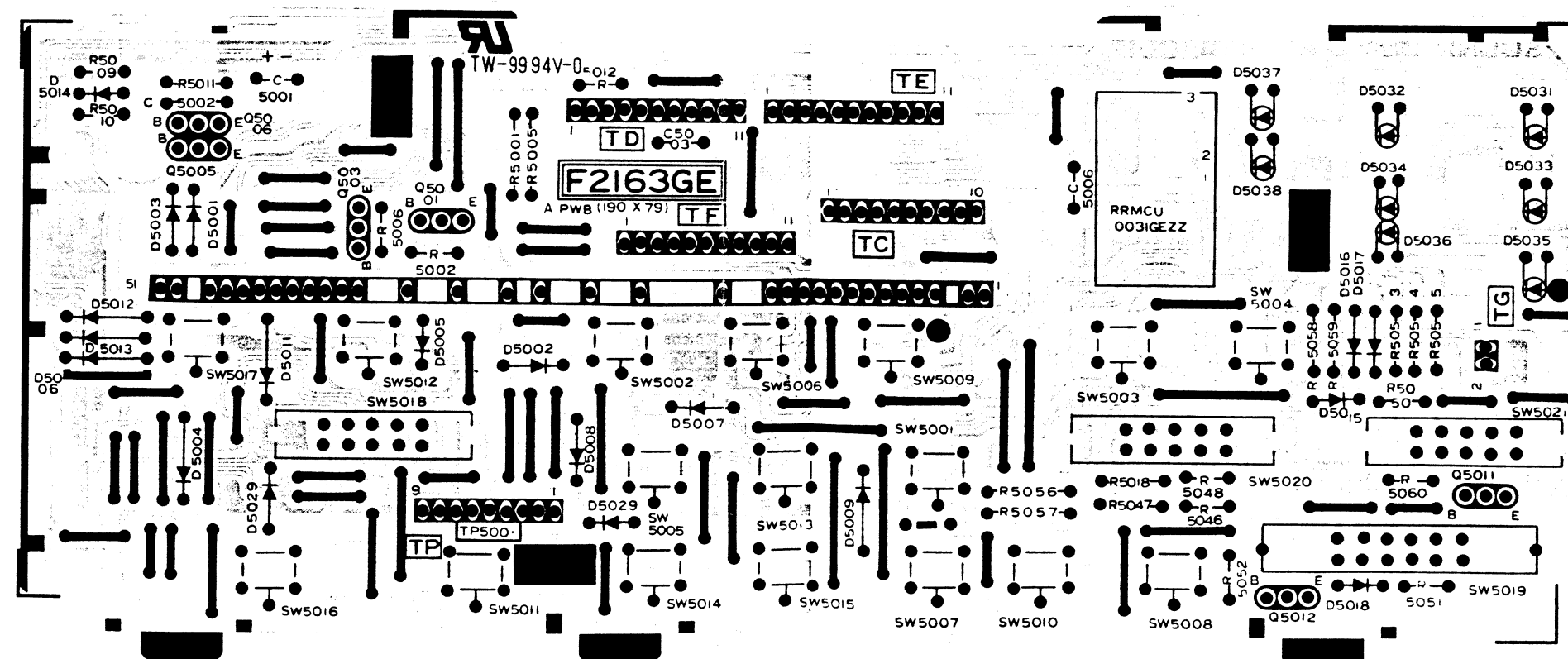


Figure 3-16.

NOTE: For Schematic Diagram, refer to Fig. 3-7.



Timer (B)

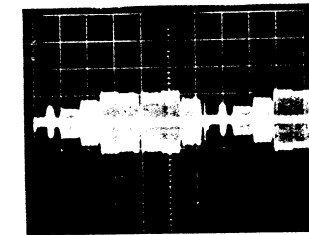


Timer (A)

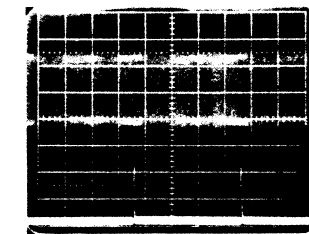
Figure 3-17.

PWB-X, HEAD AMPLIFIER CIRCUIT WIRING SIDE PWB

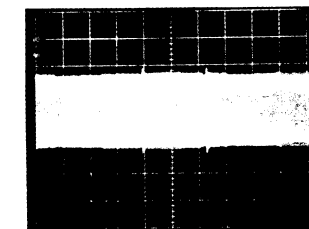
NOTE: For Schematic Diagram, refer to Fig. 3-8.



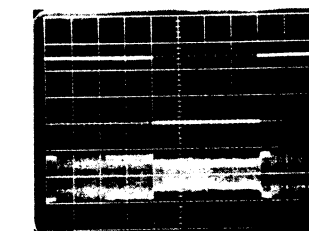
TP31
Chrominance signal
10mV/Division
10 μ sec/Division
—Record mode—



- TP31(+), TP32(-)
Record current
5msec/division
50mV(AC)/division
—Record mode—



- TP31
Frequency modulation signal
50mV/Division
10μsec/Division
— Record mode —



- TP32
Head switching pulse
5msec/division
2V(DC)/division
– Playback mode –
- TP31
Playback FM output signal
5msec/division
0.2V(AC)/division
– Playback mode –

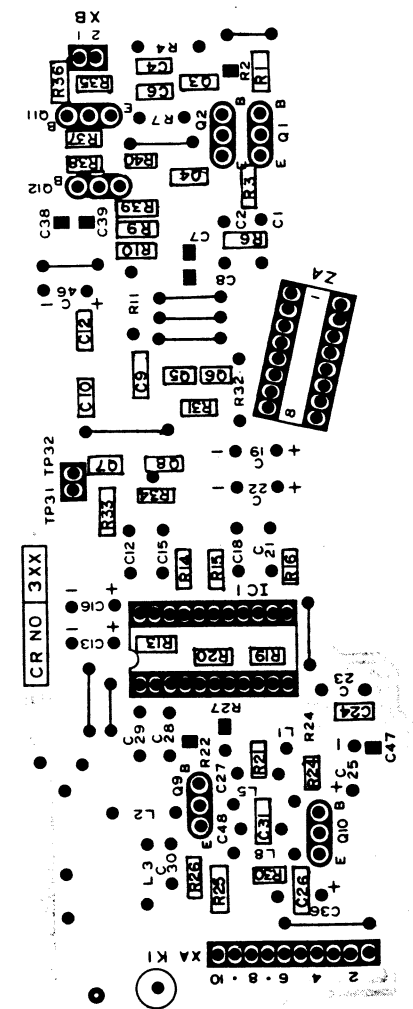


Figure 3-20.

NOTE: For Schematic Diagram, refer to Fig. 3-6.



PWB-P, POWER CIRCUIT WIRING SIDE PWB

NOTE: For Schematic Diagram, refer to Fig. 3-9.

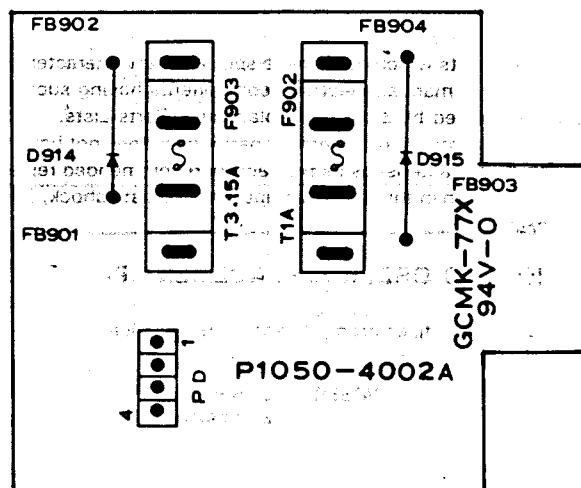
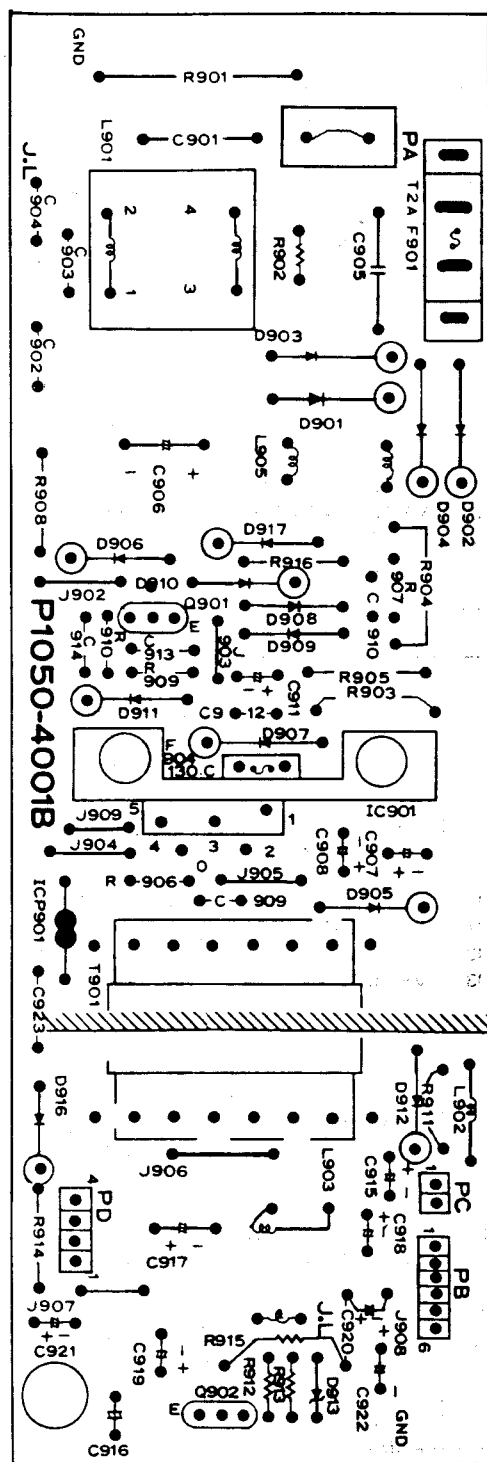


Figure 3-21.

PARTS LIST

PARTS REPLACEMENT

Replacement parts which have these special safety characteristics identified in this manual; electrical components having such features are identified by Δ in the Replacement Parts Lists. The use of a substitute replacement part which does not have the same safety characteristics as the factory recommended replacement parts shown in this service manual may create shock, fire or other hazards.

"HOW TO ORDER REPLACEMENT PARTS"

To have your order filled promptly and correctly, please furnish the following informations.

- | | |
|-----------------|----------------|
| 1. MODEL NUMBER | 2. REF. NO. |
| 3. PART NO. | 4. DESCRIPTION |
| 5. CODE | |

PARTS LIST				REF. NO.	PART NO.	DESCRIPTION	CODE
PARTS REPLACEMENT				Q802	VS2SC945APQ1E	Switching	AB
Replacement parts which have these special safety characteristics identified in this manual; electrical components having such features are identified by Δ in the Replacement Parts Lists. The use of a substitute replacement part which does not have the same safety characteristics as the factory recommended replacement parts shown in this service manual may create shock, fire or other hazards. "HOW TO ORDER REPLACEMENT PARTS" To have your order filled promptly and correctly, please furnish the following informations. 1. MODEL NUMBER 2. REF. NO. 3. PART NO. 4. DESCRIPTION 5. CODE				Q803	VS2SC945APQ1E	Amplifier, Master pulse	AB
				Q804	VS2SC945APQ1E	Amplifier, Slave pulse	AB
				Q805	VS2SC2001-K-1	Brake driver	AD
				Q807	VS2SC1815YW-1	All time 5V generator	AC
				Q809	VS2SC945APQ1E	Switching	AB
				Q810	VS2SC945APQ1E	Switching	AB
				Q811	VSDTC144ES/-1	Switching	AB
				Q812	VSDTC144ES/-1	Switching	AB
				Q813	VSDTC144ES/-1	Switching	AB
				Q814	VS2SA733APQ1E	Reset pulse generator	AC
				Q7001	VS2SC945APQ1E	Switching, 50Hz ON	AB
				Q7002	VS2SC945APQ1E	Switching, 60Hz ON	AB
				Q7003	VS2SC945APQ1E	Amplifier, Clock	AB
				Q7004	VSDTC144ES/-1	Switching	AB
				Q7005	VSDTC144ES/-1	Switching	AB
				Q7006	VSDTA144ES/-1	Switching	AB
				Q7007	VSDTA144ES/-1	Switching	AB
				Q7008	VS2SA733APQ1E	Switching, Standard play (High)	AC
				Q7009	VS2SC945APQ1E	Switching	AB
				Q7010	VS2SC945APQ1E	Switching	AB
Q7011	VS2SA733APQ1E	Switching	AC				
REF.NO.	PART NO.	DESCRIPTION	CODE	INTEGRATED CIRCUITS			
PRINTED WIRING BOARD ASS'Y (Not Replacement Item)				IC701	VHi AN6359N/-1	Capstan motor input/output control	AU
PWB-A	DUNTK2159HE50	System control, Servo circuit	—	IC702	RH-i X0162GEZZ	Servo control	AW
PWB-B	DUNTK2160HE50	Audio chroma circuit	—	IC703	VHi AN6346N/-1	Drum motor input/output control	AQ
PWB-C	DUNTK2161HE50	Y/C, IF circuit	—	IC704	VHi i R3702// -1	Amplifier	AF
PWB-H	DUNTK2164HE00	Operation circuit	—	IC705	VHi UPD4069U-1	Inverter	AE
PWB-R	DUNTK2198HE50	Test signal sound converter circuit	—	IC801	RH-i X0234GEZZ	System control	AX
PWB-T	DUNTK2163HE00	Timer circuit (A), (B)	—	IC803	VHi BA6238AU-1	Motor driver	AH
PWB-W	DUNTK2162HE50	Relay circuit	—	IC7001	RH-i X0200GEZZ	Trick control	AT
PWB-X	DUNTK2040TM55	Head amplifier circuit	—	IC7002	VHi AN3791// -1	Mono-Multi control	AL
PWB-P	RDENC0184GEZZ	Power circuit	—	IC7003	VHi UPD4081B-1	And gate	AE
PWB-A				DIODES			
TRANSISTORS				D701	VHDERB1201/-1	Diode (ERB1201)	AB
Q701	VS2SC2001-K-1	Brake driver	AD	D702	VHD1SS119// -1	Diode (1SS119)	AB
Q702	VS2SD468-C/-1	Brake driver	AD	715			
Q703	VSDTA144ES/-1	Switching	AB	D716	RH-EX0012GEZZ	Zener diode (RD3.6EB)	AB
Q704	VS2SC945APQ1E	Amplifier	AB	D717	VHD1SS119// -1	Diode (1SS119)	AB
Q705	VSDTC144ES/-1	Switching	AB	726			
Q706	VSDTA144ES/-1	Switching	AB	D801	VHD1SS119// -1	Diode (1SS119)	AB
Q707	VSDTC144ES/-1	Switching	AB	803			
Q708	VSDTA144ES/-1	Switching	AB	D804	RH-EX0163GEZZ	Zener diode (HZZ12EB3)	AA
Q709	VS2SA733APQ1E	Switching	AC	D805	VHD1SS119// -1	Diode (1SS119)	AB
Q710	VSDTC144ES/-1	Switching	AB	D806	RH-EX0020GEZZ	Zener diode (5.1EB3)	AE
Q711	VSDTC144ES/-1	Switching	AB	D807, 808	VHD1SS119// -1	Diode (1SS119)	AB
Q712	VS2SC945APQ1E	Amplifier	AB	D7001, 7004, 7005, 7007	VHD1SS119// -1	Diode (1SS119)	AB
Q713	VS2SC945APQ1E	Amplifier, Clock	AB	7018			
Q714	VSDTC144ES/-1	Switching, 60Hz ON	AB				
Q715	VSDTC144ES/-1	Switching, 50Hz ON	AB				
Q716	VS2SA733APQ1E	Switching	AC				
Q717	VSDTC144ES/-1	Switching	AB				
Q718	VSDTC144ES/-1	Switching, 50Hz ON	AB				
Q719	VS2SC945APQ1E	Amplifier	AB				
Q720	VS2SC1983// -1	Regulator, 5V	AH				
Q721	VS2SC945APQ1E	Emitter follower	AB				
Q722	VSDTC144ES/-1	Switching, 50Hz ON	AB				
Q801	VS2SC945APQ1E	Switching	AB				

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
CAPACITORS				AI	QPLGN1089GEZZ	Plug (10 pin)	AE
C708, 723	VCE9EA1HW225M	2.2 μ F, 50V, Electrolytic (non-polar)	AB	AJ	QPLGN1278GEZZ	Plug (12 pin)	AC
C741, 748	VCEAEA0JW107M	100 μ F, 6.3V, Electrolytic	AB	AL	QPLGN0678GEZZ	Plug (6 pin)	AB
C810, 811	VCE9EA1HW105M	1 μ F, 50V, Electrolytic (non-polar)	AC	AT	QPLGN1178GEZZ	Plug (11 pin)	AC
				AX	QPLGN1089GEZZ	Plug (10 pin)	AE
				AY	QPLGN1089GEZZ	Plug (10 pin)	AE
				AZ	QPLGN1089GEZZ	Plug (10 pin)	AE
CONTROLS				PWB-B			
R748	RVR- M4177GEZZ	1M ohm, Pot., 60Hz channel-1 adj.	AB	TRANSISTORS			
R750, 752	RVR- M4171GEZZ	100k ohm, Pot., 50Hz channel-1 adj.	AB	Q601	VSDTC144ES/ - 1	ALC mute	AB
		100k ohm, Pot., 50Hz channel-2 adj.		Q602	VSDTC144ES/ - 1	Record mute	AB
R754	RVR- M4177GEZZ	1M ohm, Pot., 60Hz channel-2 adj.	AB	Q605	VS2SD468- C/ - 1	Bias oscillation	AD
R756	RVR- M4171GEZZ	100k ohm, Pot., Trap. S. T. adj.	AB	Q606	VSDTC144ES/ - 1	Switching, PAL mode	AB
R781	RVR- M4159GEZZ	1k ohm, Pot., 5V adj.	AB	Q611	VSDTC144ES/ - 1	Long play Mode	AB
R7002, 7004	RVR- M4171GEZZ	100k ohm, Pot., 50Hz long play X-Shift adj.	AB	Q612	VSDTC144ES/ - 1	Switching, EP/LP mode	AB
		100k ohm, Pot., 50Hz standard play X-Shift adj.		Q613	VSDTC144ES/ - 1	Inverter	AB
R7034, 7035, 7036, 7037	RVR- M4173GEZZ	220k ohm, Pot., PAL standard play tracking preset adj.	AB	Q614	VS2SD655- DE1E	Tuner mute	AC
		220k ohm, Pot., PAL long play tracking preset adj.		Q615	VSDTA144ES/ - 1	Mute	AB
		220k ohm, Pot., NTSC standard play tracking preset adj.		Q616	VS2SD655- DE1E	Aux. mute	AC
R7038, 7039	RVR- M4171GEZZ	220k ohm, Pot., NTSC EP tracking preset adj.	AB	Q5701	VS2SC945APQ1E	Switching, Playback output	AB
		100k ohm, Pot., 50Hz false vertical adj.		Q5702	VS2SC945APQ1E	Switching, Record chrominance output (NTSC)	AB
		100k ohm, Pot., 60Hz false vertical adj.		Q5703	VS2SC945APQ1E	3.58MHz oscillation output	AB
				Q5705	VS2SC945APQ1E	Switching, Playback chrominance output (SECAM)	AB
				Q5706	VS2SC945APQ1E	Record chrominance output (SECAM)	AB
				Q5709	VS2SC1815YW- 1	5.5V regulator	AC
				Q5711	VS2SA733APQ1E	Switching, Record chrominance	AC
				Q5712	VS2SA733APQ1E	Amplifier, Playback chrominance	AC
				Q5713	VS2SA733APQ1E	Switching, Record 5V	AC
				Q5714	VS2SA733APQ1E	Switching, Record 5V	AC
				Q5715	VSDTC144ES/ - 1	Switching, Playback gate	AB
				Q5716	VS2SA733APQ1E	Amplifier	AC
				Q5720	VS2SA733APQ1E	Amplifier, PAL colour	AC
				Q5721	VS2SC945APQ1E	Switching, PAL colour amp.	AB
				Q5722	VS2SC945APQ1E	Switching, PAL colour amp.	AB
COILS				INTEGRATED CIRCUITS			
L701	VP- LK680K0000	68 μ H	AB	IC601	VHi AN3990/ - 1	Amplifier, Audio	AK
L702	VP- DF221K0000	220 μ H	AB	IC602	VHi UPC1513H- 1	Head Switching, Record/ Playback	AH
L7001	VP- DF221K0000	220 μ H	AB	IC5701	VHi HA11845NT1	NTSC 3.58MHz colour	AW
				IC5702	VHi BA7107/ - 1	SECAM, Colour	AT
RESISTOR				DIODES			
R701	VRS- VV3LB101J	100 ohm, 3W, Metal oxide	AB	D601, 602, 603, 610	VHD1SS119/ - 1	Diode (1SS119)	AB
				D5702	VHD1SS119/ - 1	Diode (1SS119)	AB
				D5705			
				D5706	RH- EX0010GEZZ	Zener diode	AG
MISCELLANEOUS							
X801	RFi LC0039GEZZ	Filter	AE				
ALM801	RALMB0007GEZZ	Alarm	AE				
AA	QPLGN0278GEZZ	Plug (2 pin)	AA				
AB	QPLGN1078GEZZ	Plug (10 pin)	AC				
AC	QPLGN0778GEZZ	Plug (7 pin)	AC				
AD	QPLGN0878GEZZ	Plug (8 pin)	AC				
AE	QPLGN0278GEZZ	Plug (2 pin)	AA				
AF	QPLGN0378GEZZ	Plug (3 pin)	AB				
AG	QPLGN0978GEZZ	Plug (9 pin)	AC				

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
CAPACITORS				BH, BI, BJ, BK	QPLGN1089GEZZ	Plug (10 pin)	AE
C606	VCEAGA1AW107M	100μF, 10V, Electrolytic	AB				
C627	VCQPKA2AA153J	0.015μF, 100V, Polypro	AB				
C5720	VCEAGA1CW107M	100μF, 16V, Electrolytic	AB				
CONTROLS				PWB-C			
				TRANSISTORS			
R5810	RVR- M4160GEZZ	1.5k ohm, Pot., Record chrominance level adj. (NTSC)	AB	Q201	VS2SC945APQ1E	Switching, Sync signal	AB
R5811	RVR- M4165GEZZ	10k ohm, Pot., Automatic phase control adj. (NTSC)	AB	Q202	VS2SA733APQ1E	Switching, High quality	AC
R5812	RVR- M7163TAZZ	10k ohm, Pot., Automatic frequency control adj. (NTSC)	AE	Q203	VSDTC144ES/ - 1	Switching, NTSC mode	AB
R5813	RVR- M4160GEZZ	1.5k ohm, Pot., Record chrominance level adj. (SECAM)	AB	Q204	VSDTA144ES/ - 1	Switching, E-E mode	AB
R5814,	RVR- M4164GEZZ	6.8k ohm, Pot., Gate 1 adj.	AB	Q205	VS2SA733APQ1E	Amplifier, Record FM	AC
5815		6.8k ohm, Pot., Gate 2 adj.		Q206	VS2SA733APQ1E	Emitter follower	AC
R6611	RVR- M4168GEZZ	33k ohm, Pot., Playback level adj.	AB	Q207	VS2SC1815YW- 1	Switching, NTSC	AC
R6612	RVR- M4174GEZZ	330k ohm, Pot., Record Bias adj.	AB	Q208	VSDTC144ES/ - 1	Switching, High quality	AB
COILS AND TRANSFORMERS				Q209	VS2SC945APQ1E	Amplifier, Colour signal	AB
L601	RCi LP0015GEZZ	8.2mH	AD	Q211	VSDTC144ES/ - 1	Switching, EP	AB
L602	VP- YF471K0000	470μH	AC	Q401	VS2SA733APQ1E	Switching, After loading playback (High)	AC
L5701, 5703, 5704	VP- DF221K0000	220μH	AB	Q402	VS2SA733APQ1E	Switching, Playback	AC
L5705	VP- DF101K0000	100μH	AB	Q403	VS2SC945APQ1E	Switching	AB
L5706	VP- XF221K0000	220μH	AB	Q404	VS2SC1815YW- 1	Luminance 5V regulator	AC
L5707	VP- MK471K0000	470μH	AB	Q405	VS2SC1815YW- 1	Colour 5V regulator	AC
L5710	VP- XF390K0000	39μH	AB	Q406	VSDTC144ES/ - 1	Head switching	AB
L5712	VP- XF221K0000	220μH	AB	Q407	VSDTC144ES/ - 1	Head switching	AB
L5713	VP- DF221K0000	220μH	AB	Q408	VSDTA144ES/ - 1	Switching, 50Hz	AB
L5715	VP- DF120K0000	12μH	AB	Q411	VS2SA733APQ1E	Emitter follower	AC
FL601	RCi LF0016GEZZ	Low pass filter	AG	Q412	VS2SC945APQ1E	17MHz oscillation	AB
FL602	RCi Li 0052GEZZ	Bias trap	AE	Q413	VS2SC945APQ1E	Amplifier, Low pass filter	AB
FL5701	RMPTD0224GEZZ	4.2MHz band pass filter/ 1.2MHz low pass filter	AG	Q414	VS2SA733APQ1E	Amplifier, Video	AC
FL5703	RMPTD0222GEZZ	3.58MHz band pass filter	AK	Q415	VS2SC945APQ1E	Video output	AB
FL5705	RMPTD0223GEZZ	1.3MHz low pass filter	AE	Q416	VS2SC945APQ1E	Video output	AB
FL5706	RMPTD0257GEZZ	4.3MHz band pass filter	AD	Q417	VS2SA733APQ1E	Bias 9V output	AC
FL5707	RMPTD0149GEZZ	4.3MHz band pass filter	AH	Q418	VS2SB772- PQ- 1	Power control 9V output	AD
DL5701	RCi LZ0187GEZZ	Delay line	AQ	Q419	VS2SC945APQ1E	Charge coupled device 8V output	AB
DL5702	RCi LZ0183GEZZ	Delay line	AK	Q420	VS2SA733APQ1E	Power control 15V	AC
T601	RTRNH0046GEZZ	Bias oscillator transformer	AE	Q421	VS2SC945APQ1E	Charge coupled device 12V output	AB
T5701, 5702	RCi LV0013GEZZ	Playback equalizer	AF	Q422	VSDTC144ES/ - 1	Camera pause	AB
T5703	RCi LV0015GEZZ	4.4MHz bell	AF	Q425	VS2SC945APQ1E	Error amp., 12V regulator	AB
MISCELLANEOUS				Q438	VS2SC1983/ / - 1	9.5V regulator	AH
X5701	RCRSB0009GEZZ	Crystal oscillator (3.58MHz)	AL	Q439	VS2SC945APQ1E	Amplifier, Error	AB
BC	QPLGN0578GEZZ	Plug (5 pin)	AB	Q501	VS2SA733APQ1E	Emitter follower	AC
				Q502	VS2SA733APQ1E	Emitter follower	AC
				Q503	VS2SC945APQ1E	Emitter follower	AB
				Q504	VS2SA733APQ1E	Amplifier	AC
				Q505	VS2SC945APQ1E	Emitter follower	AB
				Q506	VS2SC945APQ1E	Emitter follower	AB
				Q507	VS2SC945APQ1E	Emitter follower	AB
				Q508	VS2SC945APQ1E	Switching, Automatic phase control (PAL)	AB
				Q509	VS2SC945APQ1E	Playback chrominance output (PAL)	AB
				Q510	VSDTA144ES/ - 1	Switching, Record/ Playback	AB
				Q511	VSDTC144ES/ - 1	Switching, Automatic phase control	AB
				Q512	VSDTC144ES/ - 1	Trick mode	AB
				Q513	VS2SA733APQ1E	Amplifier, Playback	AC
				Q514	VS2SC945APQ1E	Switching, HSP	AB
				Q515	VS2SC945APQ1E	4.43MHz output	AB
				Q516	VS2SC945APQ1E	4.44MHz oscillation	AB
				Q517	VS2SA733APQ1E	Emitter follower	AC

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
Q519	VS2SA733APQ1E	Amplifier, Record chrominance signal	AC	C458	VCEAGA1CW107M	100 μ F, 16V, Electrolytic	AB
Q521	VSDTC144ES/- 1	Switching, NTSC	AB	C463	VCEAGA1AW477M	470 μ F, 10V, Electrolytic	AC
Q522	VSDTA144ES/- 1	SECAM Long play killer	AB	C555	VCEAGA1AW107M	100 μ F, 10V, Electrolytic	AB
Q523	VSDTC144ES/- 1	SECAM Long play killer	AB	CONTROLS			
Q524	VSDTA144ES/- 1	SECAM Long play killer	AB	R223,	RVR- M7164TAZZ	10k ohm, Pot., Deviation adj.	AE
Q1501	VS2SC1906// 1E	Amplifier, Intermediate frequency	AC	224		10k ohm, Pot., Carrier adj.	
Q1502	VS2SA733APQ1E	Emitter follower	AC	R227,	RVR- M4169GEZZ	47k ohm, Pot., Dark clip adj.	AB
Q1503	VS2SC945APQ1E	Amplifier, Colour signal	AB	228,		47k ohm, Pot., White clip adj.	
Q1504	VS2SC945APQ1E	Amplifier, Sync signal	AB	229		47k ohm, Pot., E-E level adj.	
Q1505	VS2SA733APQ1E	Amplifier, Inverter signal	AC	R233	RVR- M4159GEZZ	1k ohm, Pot., Record FM luminance level adj.	AB
Q1506	VSDTC144ES/- 1	AFT mute	AB	R404	RVR- M4169GEZZ	47k ohm, Pot., Playback luminance level adj.	AB
Q1507	VS2SC383- WT- 1	Voltage control	AE	R443	RVR- M4159GEZZ	1k ohm, Pot., Trick level adj.	AB
Q1509	VS2SA733APQ1E	Video output (NTSC)	AC	R464	RVR- M4160GEZZ	1.5k ohm, Pot., 9.5V adj.	AB
Q1510	VS2SC945APQ1E	Amplifier, Sync signal	AB	R519	RVR- M7164TAZZ	10k ohm, Pot., Automatic phase control adj.	AE
Q1511	VS2SC945APQ1E	Mixer	AB	R549	RVR- M7134TAZZ	6.8k ohm, Pot., Automatic frequency control adj.	AC
Q1512	VS2SA733APQ1E	Amplifier, 12MHz	AC	R553	RVR- M4160GEZZ	1.5k ohm, Pot., Record chrominance level adj. (PAL)	AB
Q1513	VSDTC144ES/- 1	Switching, Audio level (NTSC)	AB	R1570	RVR- M7162TAZZ	4.7k ohm, Pot., Radio frequency automatic gain control adj.	AE
Q1514	VS2SC1815YW- 1	Switching, NTSC trap	AC	COILS AND TRANSFORMERS			
Q1515	VSDTC144ES/- 1	Switching, Video input	AB	L201	VP- DF101K0000	100 μ H	AB
Q1516	VSDTC144ES/- 1	Switching, NTSC	AB	L202	VP- XF151K0000	150 μ H	AB
INTEGRATED CIRCUITS				L203	VP- XF680K0000	68 μ H	AB
IC201	VHi AN3215K/- 1	EE/Record Y signal control	AT	L204	VP- XF151K0000	150 μ H	AB
IC401	VHi AN3321K/- 1	Playback Y signal control	AR	L206	VP- XF221K0000	220 μ H	AB
IC402	VHi TL8605P/- 1	Charge coupled device	AW	L401	VP- XF121K0000	120 μ H	AB
IC404	VHi TA7347P/- 1	Switching, Charge coupled device	AG	L402	VP- XF150K0000	15 μ H	AB
IC501	VHi HA11871NT1	PAL/ME-SECAM colour control	AV	L404	VP- XF121K0000	120 μ H	AB
IC502	VHi BA7007// - 1	ME-SECAM selector	AM	L405	VP- XF680K0000	68 μ H	AB
IC1501	RH- i X0212GEZZ	PIF/SIF detector	AM	L406	VP- DF101K0000	100 μ H	AB
IC1502	RH- i X0037CEZZ	Regulator, 31.6V	AF	L407	VP- XF151K0000	150 μ H	AB
IC1503	RH- i X0203GEZZ	Band switching	AE	L408,	VP- XF120K0000	12 μ H	AB
IC1504	VHi BA7021// - 1	Switching, Video input	AE	409			
DIODES				L410,	VP- DF221K0000	220 μ H	AB
D201,	VHD1SS119// - 1	Diode (1SS119)	AB	411			
203				L412	VP- XF220K0000	22 μ H	AB
206				L413	VP- XF330K0000	33 μ H	AB
D401	VHD1SS119// - 1	Diode (1SS119)	AB	L414	VP- DF680K0000	68 μ H	AB
D402	RH- EX0020GEZZ	Zener diode (5.1EB)	AE	L415	VP- DF101K0000	100 μ H	AB
D403,	VHD1SS119// - 1	Diode (1SS119)	AB	L501	RCi LP0015GEZZ	8.2mH	AD
407				L503,	VP- XF150K0000	15 μ H	AB
D408	RH- EX0010CEZZ	Zener diode	AG	504			
D501,	VHD1SS119// - 1	Diode (1SS119)	AB	L505	VP- XF221K0000	220 μ H	AB
502,				L506	VP- MK561K0000	560 μ H	AB
504,				L507,	VP- XF221K0000	220 μ H	AB
507,				511			
508,				L512	VP- YF153K0000	15mH	AC
509,				L513	RCi LP0014GEZZ	6.8mH	AD
511				L517	VP- XF221K0000	220 μ H	AB
515				L1501	VP- XF1R2K0000	1.2 μ H	AB
D1502,	VHD1SS119// - 1	Diode (1SS119)	AB				
1503							
CAPACITORS							
C224	VCEAGA1AW227M	220 μ F, 10V, Electrolytic	AB				

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
L1502	VP- XF100K0000	10μH	AB	PWB-H			
L1503	VP- XF390K0000	39μH	AB	DIODE			
L1504	VP- DF680K0000	68μH	AB	D8101	RH- PX0061GEZZ	LED, Operation	AG
L1505	VP- XF100K0000	10μH	AB				
L1507	VP- XF120K0000	12μH	AB				
L1509	VP- XF4R7K0000	4.7μH	AB				
L1521, 1522	VP- XF100K0000	10μH	AB	CONTROLS			
L1523	VP- XF820K0000	82μH	AB	R8109	RVR- B4296GEZZ	200k ohm, Pot., False vertical sync adj.	AD
L1524	VP- XF101K0000	100μH	AB				
L1525	VP- XF220K0000	22μH	AB	R8112	RVR- B4295GEZZ	20k ohm, Pot., Picture tone adj.	AD
L1526	VP- XF3R3K0000	3.3μH	AB				
L1527	VP- XF150K0000	15μH	AB	R8113, 8114	RVR- B4296GEZZ	200k ohm, Pot., Tracking adj.	AD
L1528, 1529	VP- XF221K0000	220μH	AB				
FL201	RMPTD0219GEZZ	3MHz low pass filter	AG	MISCELLANEOUS			
FL202	RMPTD0220GEZZ	Equalizer	AK	SW8101, 8102, 8103, 8104, 8105, 8106, 8107, 8108, SW8109	QSW- K0030GEZZ	Switch, Operation Switch, Eject Switch, Playback Switch, Stop Switch, Rewind Switch, Fast-forward Switch, Pause/Still Switch, Record Switch, Record speed	AB
FL501	RMPTD0221GEZZ	4.43MHz band pass filter	AK				
FL502	RMPTD0239GEZZ	1.4MHz low pass filter/ 5.06MHz band pass filter	AG				
FL503	RFiLC0029TAZZ	4.5MHz filter	AD				
FL1501	RFiLC0066GEZZ	Surface acoustic wave filter	AK				
FL1502	RFiLC0040GEZZ	Detector, 5.5MHz	AE				
FL1503	RFiLC0061CEZZ	Filter, 5.5MHz	AF				
FL1504	RFiLC0020CEZZ	Trap, 5.5MHz	AE				
FL1505	RFiLC0024CEZZ	Trap, 6.5MHz	AE				
FL1506	RFiLC0023CEZZ	Trap, 6MHz	AE				
FL1507	RFiLC0013CEZZ	Trap, 4.5MHz	AE	SW8109	QSW- S0132GEZZ	Switch, Record speed	AD
DL401	RCiLZ0199GEZZ	Drop out, PAL	AM				
DL501	RCiLZ0191GEZZ	2H delay, PAL	AM	PWB-R			
DL502	RCiLZ0195GEZZ	1H delay, NTSC 4.43MHz	AR	TRANSISTORS			
T1501	RCiLD0130CEZZ	Detector, PIF	AD	Q1601	VS2SC945APQ1E	Switching, Mode	AB
T1502	RCiLD0017GEZZ	Detector, AFT	AD	Q1602	VS2SC945APQ1E	Switching, Mode	AB
T1503	RCiLi0371CEZZ	Trap, NTSC	AD	Q1603	VS2SC945APQ1E	Emitter follower	AB
RESISTOR				Q1604	VS2SA733APQ1E	Emitter follower	AC
R475	VRS- VV3DB4R7J	10 ohm, 2W, Metal oxide	AA	INTEGRATED CIRCUIT			
MISCELLANEOUS				IC1601	VHi BA7004 / - 1	Test signal generator	AK
X401 X501 X502 CA, CB, CC, CD CE CG CH CI CK	VTUVTSA6S2Z / /	VHF tuner	BG	DIODES			
	RTUNE0326GEZZ	Radio frequency converter	BE	D1601, 1602	VHD1SS119 / - 1	Diode (1SS119)	AB
	RCSB0067GEZZ	Crystal oscillator, 17MHz	AG				
	RCSB0002CEZZ	Crystal oscillator, 4.43MHz	AM	COIL			
	RCSB0049GEZZ	Crystal oscillator, 4.44MHz	AK	L1601	VP- XF270K0000	27μH	AB
	QPLGN1272GEZZ	Plug (12 pin)	AD				
	QPLGN1072GEZZ	Plug (10 pin)	AC	MISCELLANEOUS			
	QPLGN1278GEZZ	Plug (12 pin)	AC	X1601 X1602 X1603 X1604 SW1601, 1602 RA	RFiLA0009CEZZ RFiLA0013CEZZ RFiLA0010CEZZ RFiLA0005GEZZ QSW- S0092CEZZ QPLGN0880GEZZ	Filter, 11.5MHz Filter, 12MHz Filter, 10MHz Filter Switch, TSG/Alarm Switch Plug (8 pin)	AF AF AF AE AE AC
	QPLGN0278GEZZ	Plug (2 pin)	AA				
	QPLGN1078GEZZ	Plug (10 pin)	AC				
	QPLGN0878GEZZ	Plug (8 pin)	AC				
	QJAKE0058GEZZ	Jack, Camera pause	AC				
	QJAKZ0006GEZZ	Jack, Video in/out	AK				
	QJAKE0055GEZZ	Jack, Audio in/out	AD				

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
PWB-T				MISCELLANEOUS			
TRANSISTORS				X5001	RDENC0151GEZZ	DC-AC converter	AM
Q5001	VS2SC2021- Q- 1	LED drive	AB	X5002	RFi LC0024GEZZ	Ceramic filter, 4MHz	AE
Q5003	VS2SC2021- Q- 1	LED drive	AB	DG5001	RCSRBO006GEZZ	Crystal oscillator, 32KHz	AK
Q5005	VS2SA937- Q/ - 1	All clear	AC	SW5001,	VVKFV092/ / - 1	Fluorescent display tube	AY
Q5006	VSDTC144F/ / - 1	All clear	AB	5002,	QSW- K0030GEZZ	Switch, Clock set	AB
Q5008	VS2C1740SQR1E	Oscillator	AC	5003,		Switch, Counter memory	
Q5009	VS2C1740SQR1E	Oscillator	AC	5004,		Switch, Length (Simple recording timer)	
Q5010	VS2SD882- Q/ 1E	All time 5.3V	AD	5005,		Switch, Start (Simple recording timer)	
Q5011	VS2SC1815GW- 1	LED drive	AB	5006,		Switch, All clear	
Q5012	VS2SA933SQR1E	Head switching, 60Hz	AB	5007,		Switch, Counter reset	
INTEGRATED CIRCUITS				5008,		Switch, Minute +	
IC5001	RH- i X0292GEZZ	Timer control	AX	5009,		Switch, Program	
IC5002	RH- i X0715CEZZ	EA ROM	AT	5010,		Switch, Counter/Timer	
IC5003	VHi PST520C21E	Detector, Power fail	AE	5011,		Switch, Minute -	
DIODES				5012,		Switch, Tuning -	
D5001	VHD1SS119/ / - 1	Diode (1SS119)	AB	5013,		Switch, Channel down	
5005,				5014,		Switch, Program clear	
5007,				5015,		Switch, Timer recording	
5008,				5016,		Switch, Setting	
5009,				5017		Switch, Tuning +	
5011				SW5018	QSW- S0121GEZZ	Switch, Channel up	AB
5018,				SW5019	QSW- S0134GEZZ	Switch, VHF/Normal/UHF	AD
5023,				SW5020,	QSW- S0121GEZZ	Switch, System	AB
5024,				5021		Switch, Auto	
5025				TA,	QPLGN1278GEZZ	Switch, System	
D5026	RH- EX0048TAZZ	Zener diode (RD6.2EB1)	AB	TB		Plug (12 pin)	AC
D5027	RH- EX0141GEZZ	Zener diode (HZS6.2EB3)	AB	TG	QPLGN0280GEZZ	Plug (2 pin)	AB
D5028,	VHD1SS119/ / - 1	Diode (1SS119)	AB		RRMCU0031GEZZ	Remote control receiver	AP
5029,				PWB-W			
5030				MISCELLANEOUS			
D5031	RH- PX0109GEZZ	LED, Auto play (Green)	AC	WA,	QSDCN1089GEZZ	Socket (10 pin)	AD
D5032	RH- PX0120GEZZ	LED, ME-SECAM (Orange)	AC	WB,			
D5033	RH- PX0047GEZZ	LED, PAL (Yellow)	AD	WC,			
D5034	RH- PX0052GEZZ	LED, SECAM	AB	WD,			
D5035,	RH- PX0109GEZZ	LED, NTSC 3.58MHz (Green)	AC	WE,	QSDCN1272GEZZ	Socket (12 pin)	AD
5036		LED, NTSC 4.43MHz (Green)		WG	QSDCN1072GEZZ	Socket (10 pin)	AD
D5037	RH- PX0076GEZZ	LED, Full auto (Green)	AC	WH	QSDCN1272GEZZ	Socket (12 pin)	AD
D5038	RH- PX0077GEZZ	LED, Repeat (Yellow)	AC	WI			
TRIMMER				WJ,			
C5009	RT0- H1047GEZZ	50pF, 32kHz oscillator adj.	AC	WK,			
RESISTORS				WL			
R5019	RMPTC0066GEZZ	56k ohm x 4, Packaged circuit	AB	WW,	QSDCN1089GEZZ	Socket (10 pin)	AD
R5038	VRS- VV3AB181J	180 ohm, 1W, Metal oxide	AA	WX			
TRANSISTORS				PWB-X			
Q301	VS2SD655- DE1E	Switching, Playback	AC	TRANSISTORS			
Q302	VS2SD655- DE1E	Switching, Playback	AC	Q301	VS2SD655- DE1E	Switching, Playback	AC
Q303	VS2SA812- M51E	Switching, Standard play	AC	Q302	VS2SD655- DE1E	Switching, Playback	AC
Q304	VS2SA812- M51E	Switching, Long play	AC	Q303	VS2SA812- M51E	Switching, Standard play	AC
Q305	VS2SC1623L51E	Switching, Record	AB	Q304	VS2SA812- M51E	Switching, Long play	AC
Q306	VS2SC1623L51E	Switching, Record	AB	Q305	VS2SC1623L51E	Switching, Record	AB
Q307	VS2SC1623L51E	Switching, Record	AB	Q306	VS2SC1623L51E	Switching, Record	AB
				Q307	VS2SC1623L51E	Switching, Record	AB

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
ΔQ308	VS2SC1623L51E	Switching, Record	AB	D916	95KUBC0143AA	Diode (EU1Z)	AD
Q309	VS2SC1923-01E	FM equalizer	AD	CAPACITORS			
Q310	VS2C1740SQR1E	Emitter follower	AC	ΔC901	95KUGFZ473BF	0.047μF, 250V, Polypro	AG
Q311	VS2SA1015Y/1E	Amplifier, Record	AC	ΔC902,	95KUGCQ102AB	1000pF, 2kV, Ceramic	AC
Q312	VS2SC1815YW-1	Amplifier, Record	AC	Δ 903			
INTEGRATED CIRCUIT				ΔC904	95KUGCQ222AB	2200pF, 2kV, Ceramic	AD
IC301	VHi AN3311K/-1	Amplifier, Playback	AS	ΔC905	95KUGFZ473BF	0.047μF, 250V, Polypro	AG
COILS				ΔC906	95KUGAR101DG	100μF, 450V, Electrolytic	AR
L301,	VP-XF330J0000	33μH	AB	ΔC907	95KUGZ0232ZZ	1μF, 400V, Electrolytic	AD
302				ΔC908	95KUGZ0461ZZ	22μF, 16V, Electrolytic	AG
L303	VP-XF220J0000	22μH	AB	ΔC911	95KUGAF100BD	10μF, 50V, Electrolytic	AD
L305	VP-XF151K0000	150μH	AB	C917	95KUGAD272CW	2700μF, 25V, Electrolytic	AK
MISCELLANEOUS				C918	95KUGAD101BU	100μF, 25V, Electrolytic	AC
XA	QPLGN1080GEZZ	Plug (10 pin)	AC	C919	95KUGAC222BU	2200μF, 16V, Electrolytic	AF
XB	QPLGN0280GEZZ	Plug (2 pin)	AB	C920	95KUGAC101BU	100μF, 16V, Electrolytic	AC
ZA	QS6CN0896GEZZ	Socket (8 pin)	AC	C921	95KUGAJ220BU	22μF, 100V, Electrolytic	AD
THE OTHER PARTS				C922	95KUGAJ1R0BU	1μF, 100V, Electrolytic	AB
	QCNW-2304GEZZ	Connecting cord	AL	ΔC923	95KUGCZ102BC	1000μF, 6kV, Electrolytic	AE
	TiNS-0844GEZZ	Operation manual	AN	RESISTORS			
	RRMCG0250GESA	Remote control transmitter	BB	ΔR901	95KUEZ0085ZZ	12M ohm, 1/2W, Carbon	AE
PWB-P				ΔR902	95KUEGG6R8AS	6.8 ohm, 5W, Cement	AE
TRANSISTORS				ΔR903	95KUEFE683AH	68k ohm, 2W, Metal oxide	AB
ΔQ901	95KUAD0038AZ	Base drive	AF	R904	95KUEFD683AY	68k ohm, 1W, Metal oxide	AB
Q902	95KUAA0019AZ	-30V regulator	AD	R905	95KUEFD823AX	82k ohm, 1W, Metal oxide	AB
INTEGRATED CIRCUIT				ΔR908	95KUEFCR39AK	0.39 ohm, 1/2W, Metal oxide	AA
ΔIC901	95KUCZ0121ZZ	Switching	AT	ΔR911	95KUEZ0033ZZ	8.2 ohm, 1/2W, Carbon	AD
DIODES				ΔR914	95KUEFC150AM	15 ohm, 1/2W, Metal oxide	AB
ΔD901,	95KUBC0098BZ	Diode (ERC05-08)	AE	R915	95KUEFE152AX	1.5k ohm, 2W, Metal oxide	AB
Δ 902,				ΔR916	95KUEFC2R7AP	2.7k ohm, 1/2W, Metal oxide	AB
Δ 903,				COILS AND TRANSFORMER			
Δ 904				ΔL901	95KUKZ0112ZZ	Line filter	AL
ΔD905	95KUBC0128AA	Diode (RU1P)	AB	L902	95KUZZ0030ZZ	100μH	AC
ΔD906	95KUBZ0008ZZ	Diode (EBR12-01)	AC	L903	95KUKZ0052ZZ	SC-03, choke	AG
ΔD907	95KUBZ0031ZZ	Diode (SV-03)	AG	L904	95KUKZ0050ZZ	SC-05, choke	AF
ΔD908,	95KUBZ0008ZZ	Diode (EBR12-01)	AC	ΔL905	95K129030027	FC-014	AL
Δ 909				ΔT901	95K129030080	Power transformer	AV
ΔD910,	95KUBC0143AA	Diode (EU1Z)	AD	MISCELLANEOUS			
Δ 911,				ΔF901	95KPJC0178ZZ	Fuse T2.0A, 250V	AD
Δ 912				ΔF902	95KPJC0308ZZ	Fuse T1.0A, 250V	AE
D913	95KUBD0135AZ	Zener diode (RD33EB)	AC	ΔF903	95KPJC0147ZZ	Fuse T5.0A, 250V	AE
ΔD914,	95KUBC0141AA	Diode (RG2Y)	AF	ΔF904	95KPJT0085ZZ	Fuse 135°C	AE
Δ 915				ΔICP901	95KPJC0282ZZ	Protector, (SSFR 1A, 125V)	AG
				PA	95KPKZ0194ZZ	Plug (3 pin)	AC
				PB	95KPKZ0446ZZ	Plug (6 pin)	AC
				PC	95KPKZ0442ZZ	Plug (2 pin)	AB
				Δ	QACCZ3005GEZZ	AC cord	AM

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
REMOTE CONTROL TRANSMITTER				CABINET PARTS			
TRANSISTORS					DCABA0291AASA	Cabinet A	AN
Q8801	VS2SC1815//1E	LED driver (2SC1815/)	AB		GCABB0049AASD	Cabinet B	AE
Q8802	VS2SC2120// - A	LED driver (2SC2120/)	AB		GC6VH0048PASB	Battery cover	AB
INTEGRATED CIRCUIT					MSPRP0210PAZZ	Rubber key	AG
IC8801	RH-IX0478PAZZ	Remote control encoder (LR3714)	AM		XYBSF26P08000	Screw	AA
DIODES AND CRYSTAL					JBTN-0652PASA	Button, Record	AC
D8801	RH-PX0068PAZZ	LED (GL-521)	AD		JBTN-0654PASA	Button, Channel	AA
D8802	RH-PX0129PAZZ	LED (GL-1PR1)	AB		JBTN-0723PASA	Button, Fast-forward/Rewind	AC
CF8801	RFLF0010PAZZ	Crystal (KBR455BTL)	AE		JBTN-0722PASA	Button, Pause/Still	AC
MISCELLANEOUS					JBTN-0721PASA	Button, Stop/Play	AC
	QTANZ0133PAZZ	Battery terminal (+)	AB		JBTN-0677PASA	Button, Slow	AC
	QTANZ0134PAZZ	Battery terminal (-)	AA		JBTN-0651PASA	Button, Power	AC
	QTANZ0135PAZZ	Battery terminal (+, -)	AB		JBTN-0676PASA	Button, Slow (+), (-)	AA
	SSAKH0049PAZZ	Polystyren sack	AA		JBTN-0724PASA	Button, Frame advance	AC

EXPLODED VIEWS AND PARTS LISTS

MECHANICAL PARTS

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
1	GCABB1050GESA	Cabinet	AW	9	QEARP0165GEFW	Earth plate	AB
3	TLABM1269GEZZ	Model label	AB	10	QEARP0173GEFW	Earth plate	AC
4	CHLDZ1563GE01	Holder, Tuner	AD	12	PFLT- 0006GEZZ	Felt	AB
4-1	LHLDZ1563GEZZ	Holder	AD	13	MHNG- 1032GEZZ	Hinge	AB
4-2	LHLDF1070GEZZ	Holder	AD	14	LX- LZ1001GEZZ	Push rivet	AA
5	CC6VA1422GE01	Antenna cover ass'y	AE	15	LHLDZ1540GEZZ	Fluorescent tube holder	AC
5-1	GC6VA1422GEZZ	Antenna cover	AD	17	LHLDZ1012GE08	Holder, LED	AC
5-2	HiNDP1205GEZZ	Indication plate, Antenna	AD	18	PSPAZ0046GEZZ	Spacer	AA
6	XEASD30P12000	Screw	AA	19	TLABS0064GEZZ	High voltage caution label	AB
7	XEASD40P16000	Screw	AA	20	LHLDZ1565GEZZ	Holder	AB
8	XHPSD30P06WS0	Screw	AA	21	LHLDZ1564GEZZ	Holder	AB

MECHANICAL PARTS DIAGRAM

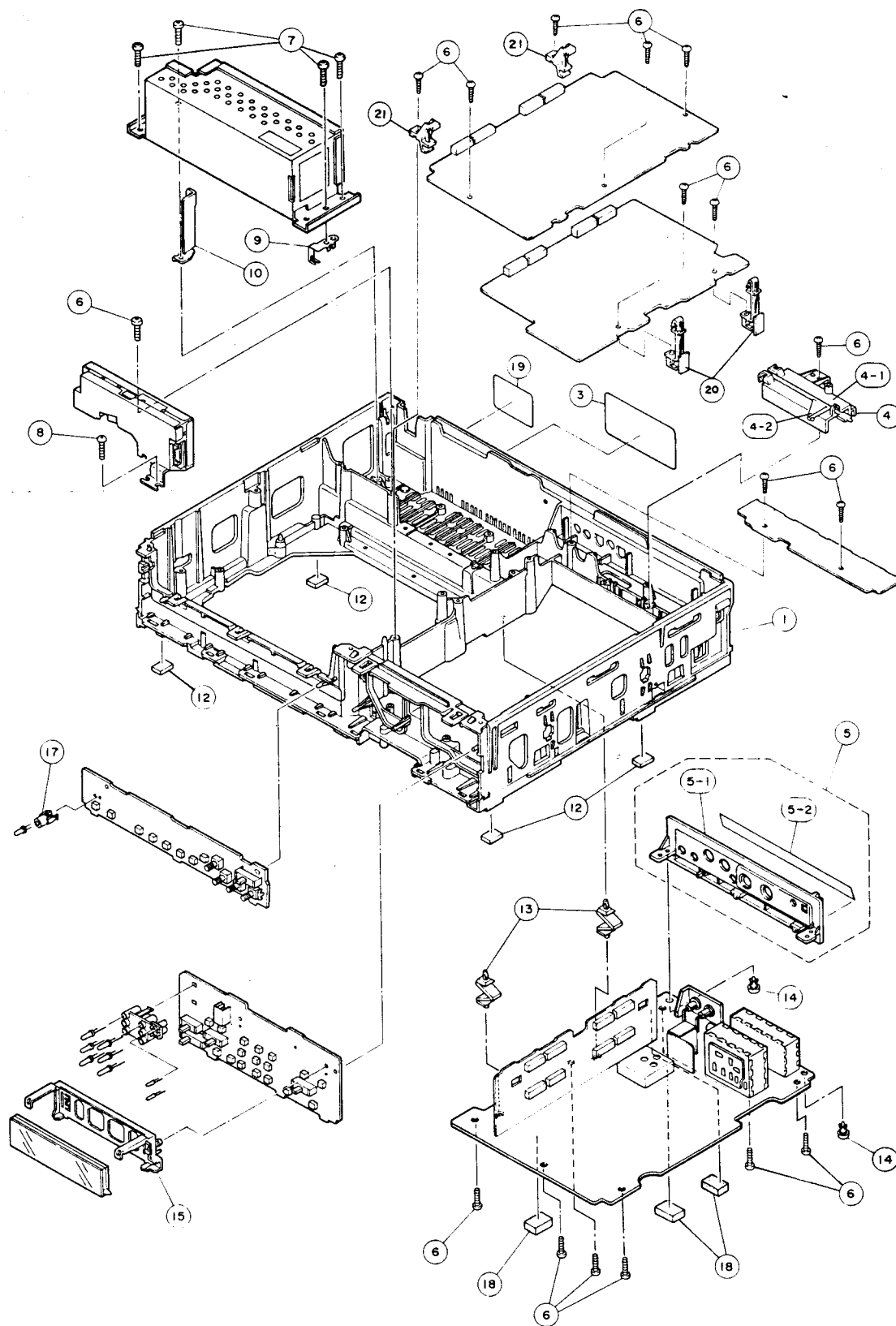


Figure 4-1.

CABINET PARTS

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
1	GCABA3021GESI	Top cabinet	AS	5-10	MSPRC0100GEFJ	Spring	AA
2	LX- HZ3030GEFN	Screw	AA	5-11	HDECQ0405GESA	Indication plate, Front panel	AT
3	GBDYU3046GEZZ	Bottom plate	AH				
4	XEASD30P12000	Screw	AA	5-12	Hi NDP1172GESA	Indication plate, Door	AG
5	CPNLC1449GE01	Front panel ass'y	BF	5-13		Door ass'y	—
5-1	CBTN- 1977GE04	Operate (Power)/	AG	5-13-1	LANGF9284GE00	Fixing metal, for door	AF
		Eject button ass'y		5-13-2	GD6RF1340GESA	Door	AM
5-2	CBTN- 1978GE01	Operation button ass'y (REW, PLAY, STOP, FF, PAUSE/STILL)	AF	5-13-3	HBDGB3007GESA	Badge, "SHARP"	AD
				5-14	PC6VU9105GEZZ	Cover, Remote control receiver	AC
5-2-1	JBTN- 1960GESA	Button, Record	AD	5-15	Hi NDP0993GESA	Indication plate, V/S	AE
5-2-2	JBTN- 1978GESA	Button, Rewind/Play/Stop/FF/Pause-Still	AC	6	Hi NDP1173GEZZ	System indication plate	AD
				7	XEBSD30P12000	Screw	AA
5-3	JBTN- 2071GESA	Button, Timer setting	AE	8	GC6VH1004GESA	Tuning button cover	AG
5-4	JBTN- 2029GESA	Button, Tuning	AE	9	TLABZ0148GEZZ	POS label	AB
5-6	LHLDZ1509GEZZ	Magnet	AD	10	TLABH0314GEZZ	Door label	AA
5-7	GC6VA1358GESA	Button cover	AC	11	TCAUH3154GEZZ	Caution label	AB
5-8	JBTN- 1822GESA	Button, Counter	AD	12	Hi NDP1172GESA	Seat	AG
5-9	JBTN- 1931GESA	Button, Channel	AD				

CABINET PARTS DIAGRAM

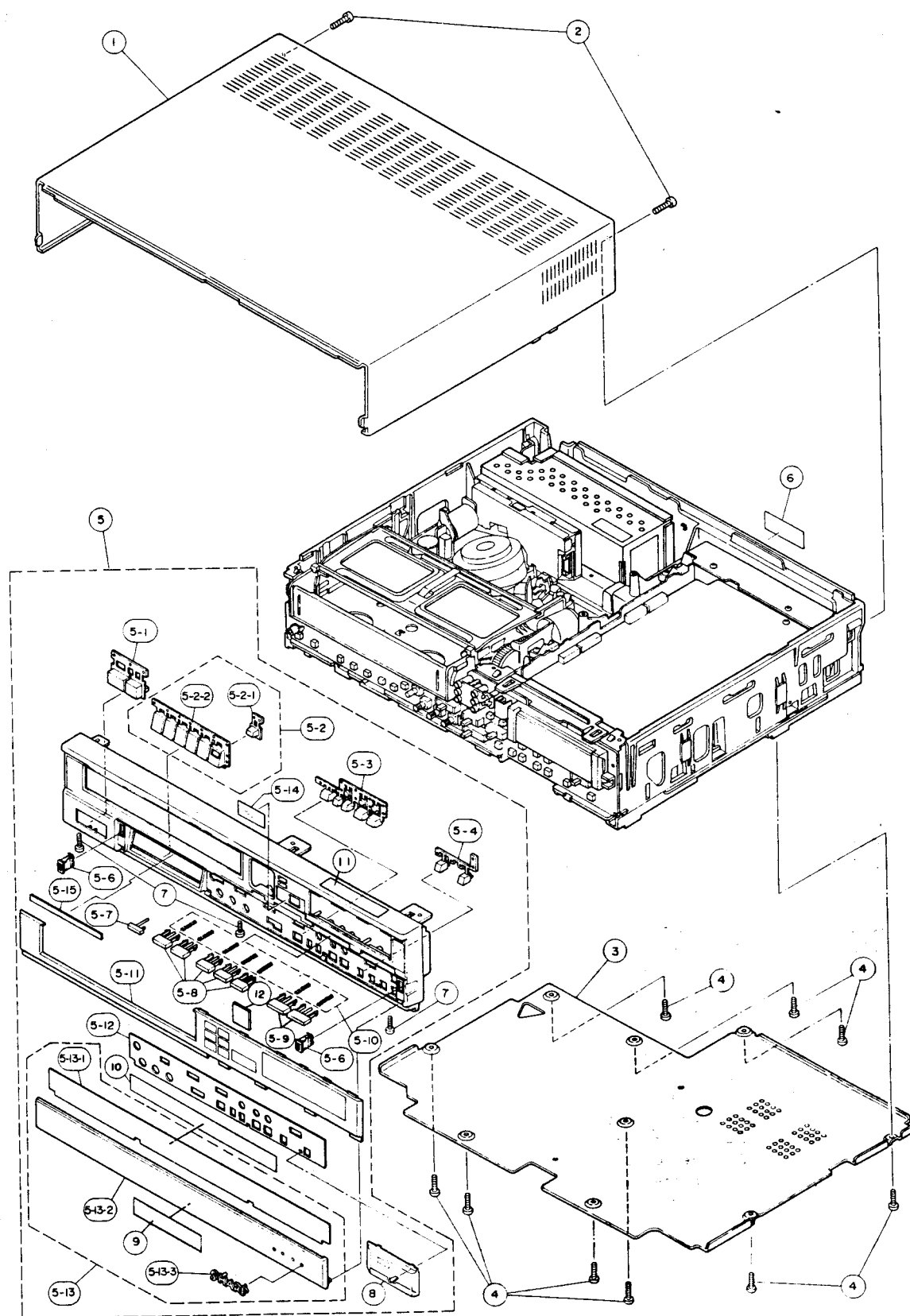


Figure 4-2.

MECHANISM CHASSIS PARTS

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
1	RH- PX0090GE01	LED sensor	AH	72	PGi DC0025GEFW	V block (B) ass'y	AE
3	DDRMU0004HE14	Upper drum ass'y	BQ	73	PGi DP0015GEFW	Retaining guide	AC
4	PGi DC0031GEFW	V base	AM	75	PGi DS0005GEZZ	Supply impedance flange	AE
5	LANGF9264GEZZ	Pinch roller relay plate	AK	78	QBRK0017GEZZ	Earth brush ass'y	AD
		ass'y		80	QPLGN0229TAZZ	Plug, 2pin (NL) (Reel sensor PWB)	AB
6	DDRML0008HE00	Lower drum ass'y	BK				
7	LANGF9255GEZZ	Mechanism control angle	AL	81	QPLGN0280GEZZ	Plug, 2pin (NF) (Loading motor PWB)	AB
10	LANGT9100GEFW	Dew sensor angle	AB				
11	LBNDK1001GEZZ	Tension band ass'y	AH				
12		Main chassis	—				
13	LCHSS0011GEZZ	Guide plate ass'y	AG	82	QPLGN0278GEZZ	Plug, 2pin (NE) (Mechanism relay PWB)	AA
14	LDAi H3013GEZZ	Audio/Control head plate	AD				
15	LHL DZ1435GEZZ	Loading motor holder	AC	84	QPLGN0880GEZZ	Plug, 8pin (NT, NA)	AC
17	LHLP1045GEZZ	Cassette LED holder	AE	87	QPWBF2350GEZZ	Dew sensor PWB	—
18	LPôLM0022GEZZ	Pole base A ass'y	AM	88	QPWBF2201GEZZ	Reel sensor PWB	—
19	LPôLM0023GEZZ	Pole base B ass'y	AM	89	QPWBF2045GEZZ	Loading motor PWB	—
20	MARMM0052GEZZ	Loading arm A ass'y	AE	90	QPWBF2356GEZZ	Full erase head PWB	—
21	MARMM0053GEZZ	Loading arm B ass'y	AE	91	QSW- F0024GEZZ	Shifter switch	AD
22	MARMM0054GEZZ	Tension arm ass'y	AE				
23	MARMP0035GEZZ	Full erase head arm	AB	92	QSW- R0019GEZZ	Cam switch	AM
24	MLEVF0229GEZZ	Pinch roller lever ass'y	AH	93	RDTCH0018GEZZ	Dew sensor	AG
25	MLEVF0225GEZZ	Brake drive lever ass'y	AF	95	RH- PX0099GEZZ	Cassette LED	AG
27	MLEVP0083GEZZ	Auxiliary brake lever	AA	96	RHEDT0019GEZZ	Full erase head ass'y	AP
28	MLEVP0084GEZZ	Torque change lever	AA	97	RHEDU0057GEZZ	Audio/Control head ass'y	AU
29	MLEVP0085GEZZ	Take-up brake lever	AC	98	RHETP0015GEZZ	Heater ass'y	AG
30	MLEVP0086GEZZ	Supply brake lever	AC	99	RMôTM1045GEZZ	Loading motor	AN
31	MLEVP0087GEZZ	Tension adjusting lever	AC	100	RMôTP1081GEZZ	Direct drive motor ass'y	BB
32	MLEVP0088GEZZ	Tension release lever	AC	101	RMôTN2004GEZZ	Capstan D.D. motor	BE
33	MSLi F0023GEZZ	Shifter ass'y (A)	AE	102	RPLU- 0075GEZZ	Brake solenoid	AG
34	MSLi F0024GEZZ	Shifter ass'y (B)	AD	104	VCKYAT1HD102M	1000pF, 20%, 50V (C8001, 8002)	AA
35	MSPRC0006GEFJ	Audio/Control head spring	AA				
37	MSPRC0084GEFJ	Audio/Control head arm spring	AA	105	VRD- RA2EE473J	(Reel sensor PWB) 47k ohm, 5%, 1/4W, carbon (R8002, 8004)	AA
39	MSPRC0086GEFJ	Brake lock spring	AA				
40	MSPRT0216GEFJ	Pinch pressure spring	AB	106	VRD- RA2EE222J	(Reel sensor PWB) 2.2k ohm, 5%, 1/4W, carbon (R8007)	AA
41	MSPRT0217GEFJ	Full erase head arm spring	AA				
42	MSPRT0218GEFJ	Tension arm spring	AA				
43	MSPRT0241GEFJ	Auxiliary brake spring	AA	107	VRD- RA2EE221J	(Reel sensor PWB) 220 ohm, 5%, 1/4W, carbon (R8001, 8003)	AA
44	MSPRT0220GEFJ	Loading gear reciprocating spring	AA				
45	MSPRT0221GEFJ	Main brake spring	AA				
48	NBLTK0039GE00	Loading belt	AB	108	LX- NZ3019GEZZ	Adjusting nut	AB
51	NDAi V1032GEZZ	Supply reel disk ass'y	AF	109	MLEVF0227GEZZ	Reverse guide lever	AC
52	NDAi V1038GEZZ	Take-up reel disk ass'y	AF	110	MSPRC0088GEFJ	Reverse guide spring	AA
54	NGERH1072GEZZ	Relay gear (B)	AB	112	MLEVP0101GEZZ	Universal brake lever	AB
55	NGERH1091GEZZ	Brake cam	AC	114	MSPRT0240GEFJ	Universal brake spring	AA
56	NGERH1090GEZZ	Master cam	AC	115	PSPAF0021GEZZ	Supply impedance roller spacer	AD
57	NGERH1075GEZZ	Loading gear (A) ass'y	AD				
58	NGERH1076GEZZ	Loading gear (B) ass'y	AC	116	VRD- RA2EE122J	1.2k ohm, 5%, 1/4W, carbon (R8008)	AA
59	NGERH3032GEZZ	Segment gear ass'y	AE				
61	NPLYV0036GEZZ	Loading motor pulley	AB	117	VRD- RA2EE152J	1.5k ohm, 5%, 1/4W, carbon (R8009)	AA
63	NPLYV0102GEZZ	Loading block ass'y	AL				
64	NPLYV0111GEZZ	Reel drive unit	AR	120	RPLU- 0080GEZZ	D.D. brake solenoid	AK
65	NRôLP0046GEZZ	Supply impedance roller	AH	121	MLEVP0102GEZZ	D.D. brake lever ass'y	AB
66	NRôLP0047GEZZ	Guide roller ass'y	AH	122	LANGF9290GEZZ	D.D. brake mounting plate	AD
67	NRôLR0013GEZZ	Pinch roller ass'y	AN	123	MSPRC0116GEFJ	Release spring	AA
68	NSFTL0215GEFW	Supply impedance sub shaft	AB	124	MSPRT0239GEFJ	D.D. brake lever spring	AA
				125	PSPAB0019GEFW	Spacer	AC
69	NSFTZ0026GEFD	Brake lock shaft	AA	126	NRôLM0016GEFW	Segment gear roller	AA
71	PGi DC0024GEFW	V block (A) ass'y	AE				

MECHANISM CHASSIS PARTS DIAGRAM

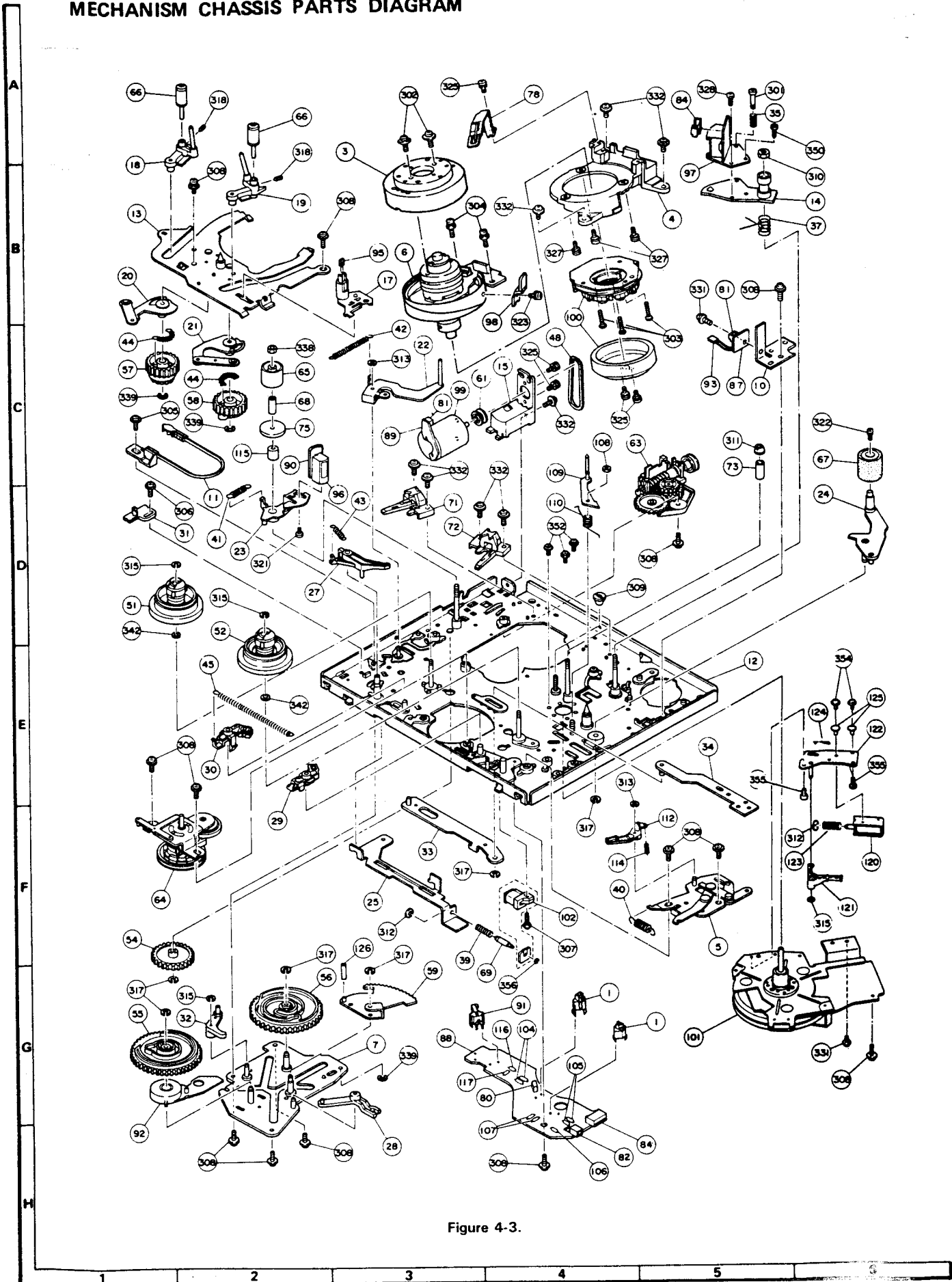


Figure 4-3.

CASSETTE HOUSING CONTROL PARTS

REF.NO.	PART NO.	DESCRIPTION	CODE	REF. NO.	PART NO.	DESCRIPTION	CODE
1	HDECQ0329GES A	Cassette cover	AH	21	NPLYV0100GEZZ	Motor pulley	AA
2	LANGF9251GEFW	Top plate	AG	22	NSFTL0442GEFD	Main shaft	AD
3	LANGF9305GEZZ	Motor angle ass'y	AC	23	PGi DM0042GE00	Down guide	AF
4	LHL DX1005GE00	Frame (right)	AK	24	PGUMM0028GEZZ	Worm anti-vibration rubber	AB
5	LHL DX1006GE00	Frame (left)	AH	26	QPLGN0980GEZZ	Plug (9 pin)	AC
6	LHL DX3029GEZZ	Slider ass'y	AL	27	QPWBF2140GEZZ	Relay P.W.B.	—
6-1	LHL DX1003GE00	Holder (right)	AG	28	QPWBF1553GEZZ	End sensor P.W.B.	—
6-2	LHL DX1004GE00	Holder (left)	AG	29	QSW- F0021GEZZ	Cassette switch	AD
6-3	LHL DX3029GEFW	Slider	AE	30	QSW- F0022GEZZ	Mode switch	AE
6-4	MARMP0028GEZZ	Lock release lever ass'y	AD	31	QSW- F0023GEZZ	Mistaken erasure prevention switch	AD
6-5	MSPRP0097GEFJ	Cassette spring	AA				
7	MARMM0051GEFW	Drive washer	AB	32	VRD- RA2BE222J	Resistor (2.2k ohm)	AA
8	MARMP0029GEZZ	Drive arm (right)	AB	33	RH- PX0053GEZZ	Photo-transistor	AF
9	MARMP0030GEZZ	Drive arm (left)	AB	34	RM0TM1040GEZZ	Cassette motor	AN
10	MARMP0031GEZZ	Cassette cover arm	AA	35	MSPRD0068GEFJ	Cassette cover spring	AA
11	MLEVP0080GEZZ	Timing lever	AA	36	VRD- RA2EE153J	Resistor (15k ohm)	AA
12	MLEVP0081GEZZ	Cover open lever	AB	37	VS2SA937- Q/ - 1	Transistor	AC
13	MSPRD0065GEFJ	Drive reciprocating spring	AA	38	VCTYP A1EX473M	Capacitor (0.047μF)	AA
14	MSPR00066GEFJ	Open lever spring	AA	39	VRD- RA2EE223J	Resistor (22k ohm)	AA
15	MSPRT0215GEFJ	Drive spring	AA	40	VRD- RA2BE272J	Resistor (2.7k ohm)	AA
16	NGERH1069GEZZ	Drive gear (right)	AC	41	LX- HZ3037GEFD	Screw	AA
17	NGERH1070GEZZ	Drive gear (left)	AB		CHL DX3035GE99	Cassette housing ass'y	BB
18	NGERH1071GEZZ	Phase gear	AA			(Note that ref.No.1	
19	NGERW1018GEZZ	Worm gear	AB			"Cassette cover" is not	
20	NGERW1019GEZZ	Worm wheel gear	AB			shipped together.)	

CASSETTE HOUSING CONTROL PARTS DIAGRAM

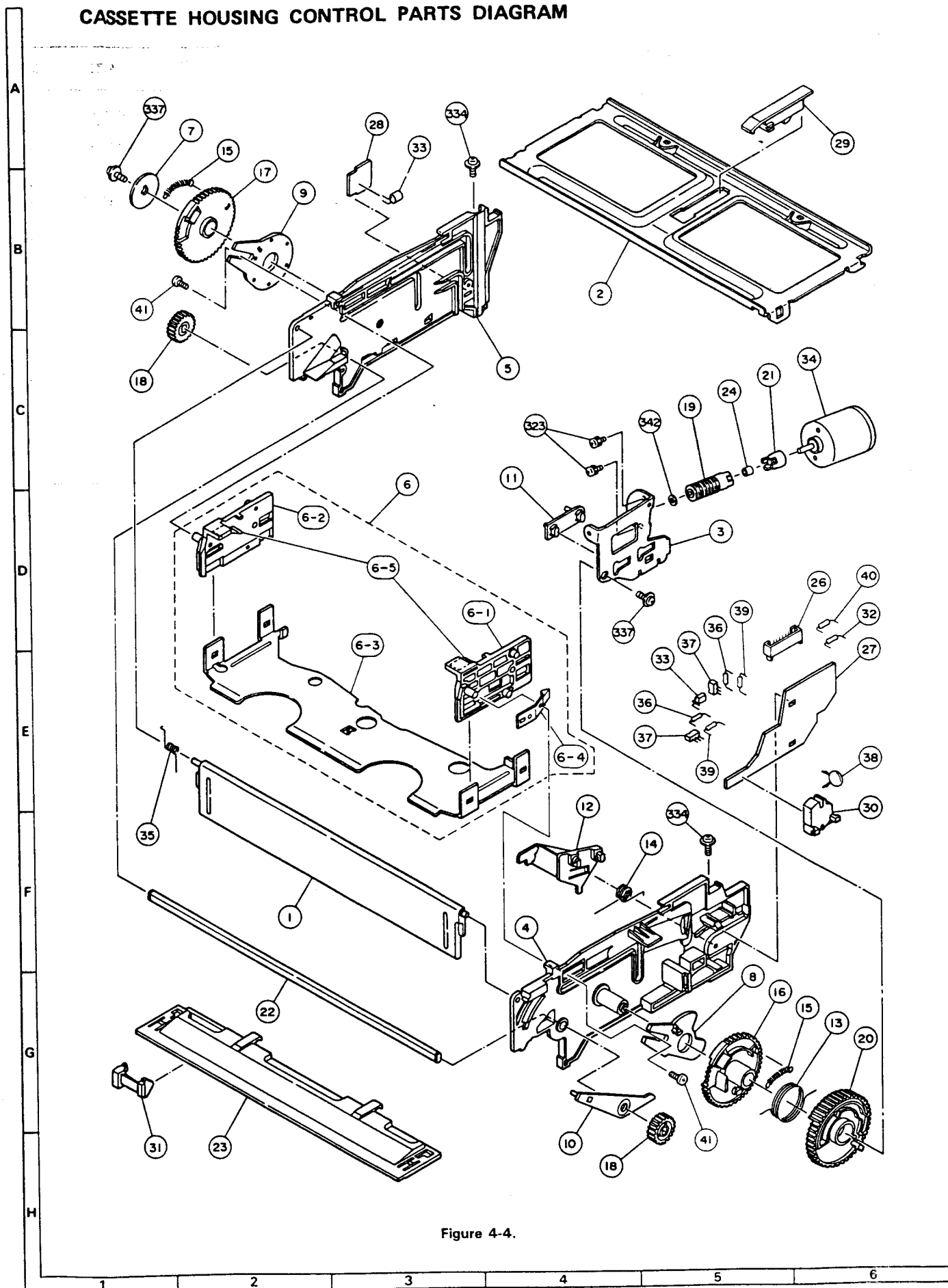


Figure 4-4.

SCREW, NUTS, WASHERS, AND WIRE CLAMP

REF. NO.	PART NO.	DESCRIPTION	SIZE	CODE	REF. NO.	PART NO.	DESCRIPTION	SIZE	CODE
301	LX- BZ3018GEZZ	AC head screw		AA	325	XBPSD30P05J00	Screw	SW3P+5S	AA
302	LX- BZ3039GEFN	Screw	W3P+9S-Ni	AA	327	XBPSD30P08J00	Screw	SW3P+8S	AA
303	XBPSD26P14J00	Screw	SW2.6P+14S	AA	328	XBPSD30P08000	Screw	3P+8S	AA
304	LX- BZ3049GEFD	Screw	WSW3P+10S	AA	331	XHPSD30P06WS0	Screw	C3P+6S	AA
305	LX- HZ3002GEFD	Screw	3x8	AA	332	XHPSD30P08WS0	Screw	C3P+8S	AA
306	LX- HZ3008GEFD	Screw	S3P+8S-W	AA	334	XHPS330P06WS0	Screw	C3P+6S (Red)	AA
307	LX- HZ3026GEFD	Screw	2x8	AA	337	XJPSD30P06WS0	Screw	C3P+6S	AA
308	LX- HZ3027GEFD	Screw	3x8	AA	338	LX- NZ3033GEFD	Nut		AA
309	LX- NZ3013GEFW	Nut		AA	339	XRESJ30- 06000	E ring	E ring-3	AA
310	LX- NZ3031GEFW	Nut		AA	342	XWHJZ31- 05054	Washer	3.1W-5.4-0.5	AA
311	LX- NZ3016GEFD	Nut		AB		XWHJZ31- 01054	Washer	3.1W-5.4-0.13	AA
312	LX- WZ1001GE00	Washer	3.2W-8-0.5	AA		LX- WZ1017GE00	Washer	3.1W-5.4-0.2	AA
313	LX- WZ1003GE00	Washer	2.1W-5-0.5	AA		LX- WZ1018GE00	Washer	3.1W-5.4-0.3	AA
315	LX- WZ1006GE00	Washer	2.6W-5.4-0.5	AA	350	LX- BZ3065GEFD	Screw		AA
317	LX- WZ1015GE00	Washer	3.6W-7.2-0.5	AA	352	LX- HZ3036GEFD	Screw	C2.6P+5.5S	AA
318	LX- XZ3001GEFP	Fixing screw	M2x3	AC	354	XBPSD20P05J00	Screw	SW2P+5S	AA
321	XBPSD20P03000	Screw	2P+3S	AA	355	XHPSD26P04000	Screw	2.6P+4S	AA
322	XBPSD26P04J00	Screw	SW2.6P+4S	AA	356	XRESJ12P03000	E ring	E ring-1.2-T0.3	AA
323	XBPSD30P04J00	Screw	SW3P+4S	AA					

PACKING OF THE SET

■ Setting positions of the knobs

Test signal switch	at "OFF" Position	Tracking knob	at "center click" Position
Picture tone	at "center" Position	Auto mode switch	at "Auto" Position
Channel selector	at "Normal" Position		

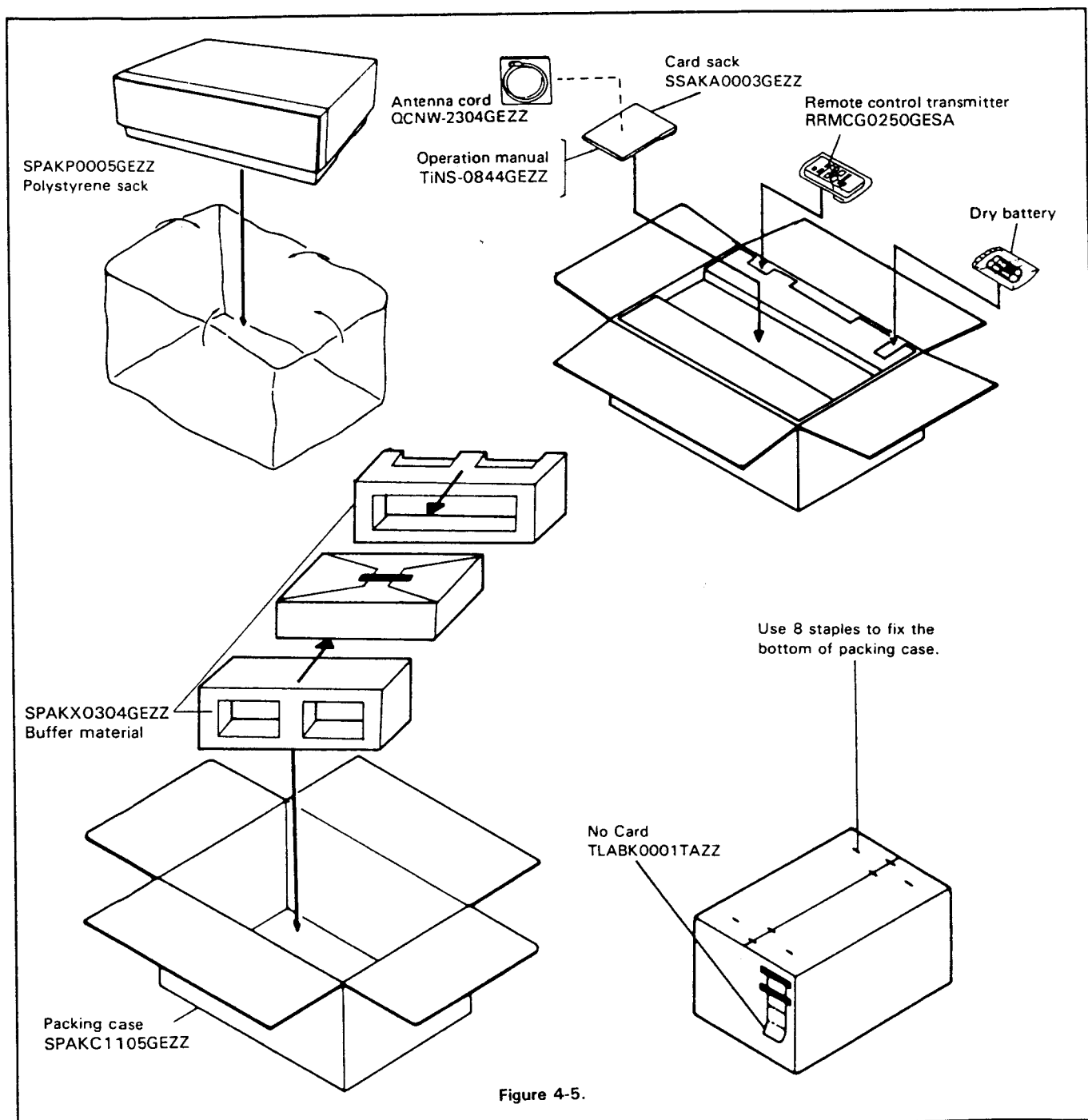


Figure 4-5.